REPORT

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UPON THE

MILITARY CANTONMENTS

OF

KAMPTEE

AND

SEETABULDEE.

BY

J. L. RANKING,
SURGEON MAJOR.
Sanitary Commissioner for Madras.

Madras:
PRINTED BY H. MORGAN, AT THE GOVERNMENT PRESS.
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REPORT

UPON THE

MILITARY CANTONMENTS OF

KAMPTEE AND SEETABULDEE

BY SURGEON MAJOR J. L. RANKING,

Sanitary Commissioner for Madras.

DATE OF INSPECTION, DECEMBER AND JANUARY 1868-69.

Introduction.

1. The earliest Report to which I have access upon the important Military Station of Kamptee, is that published by the late Medical Board of Madras in 1844 under the title of the "Medical Topography and Statistics of the Nagpore Division of the Army."

The general arrangement of the Cantonment and the positions occupied by the several arms of the Force, have undergone, but little alteration since that period, and the description given in the Report alluded to of the general features of the station may be still accepted as sufficiently accurate.

In 1862, the "Inspection Reports" compiled by the late Dr. Macpherson of the Madras Army, while Inspector General of Hospitals were printed by order of Government. The volume contains a Medical and Topographical Report of the station; and the sanitary features and conditions of the Cantonment are further fully illustrated by the Committee, which assembled under orders of the Home Authorities to reply to questions submitted by the Royal Commissioners appointed to enquire into the sanitary state of the Army in India, and which will be found at page 366, Vol. II of the Report by that Commission.

From these several sources I have derived much of the information, I shall presently advance in the section devoted to a general description of the Cantonment, and I do not think it necessary after this acknowledgment of my indebtedness to them, to indicate in every instance the source whence I have gathered information, the accuracy of which I have verified as far as lay in my power during my inspection of the station.

2. This Report is limited to subjects involving the health of the Troops stationed at Kamptee including the dependency of Seetabuldee. It is in fact strictly Military and does not trench upon any subjects within the cognizance of the Sanitary Commissioner recently appointed, in the Civil Department, to the Central Provinces.

Topographical description of the Station of Kamptee.

3. The Cantonment is situated in 21° 11′ north latitude, and 79° 50′ east longitude, at an elevation of about 900 feet above the level of the sea, upon the right bank of Kanhan river (very shortly below its confluence with the Pench and Koolar) which pursues a tortuous course from west to east presenting at some spots lofty and precipitous

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banks as much as 47 feet above its bed, and in others shelving shores, which during certain seasons of the year expose extensive tracts of sand and silt, and to which the prevalence of the fevers, so common to the station, have partly been attributed. These alternations of cliffs and sandy shores depend upon the set of the current and its abrading action upon the soil. At present the current sets strongly upon the bank along which the Officers' Bungalows are erected and it is making considerable inroads upon it.

Area.

4. The area occupied is 4598·81 acres or 7·19 square miles. It is well wooded. In Cantonments the trees are lopped of their branches to within 12 feet of the ground; the hedges are cut to 4 feet, and redundant vegetation carefully kept down.

Soil.

5. The soil is a dark loam known as the "regur" or "cotton soil" of great, but varying depth, below which is nodular lime stone or "kunkur" overlying sandstone, which comes to the surface on the opposite side of the river, and is quarried as a building stone for the public buildings now in course of erection or about to be erected. Gravel pits also exist in the locality.

Station intersected with ravines and water-courses.

6. The whole area upon which the Cantonment stands is intersected with ravines and water-courses constituting the natural drainage channels of the country, and indicating with much significance the disregard to all sanitary consideration evinced by the authorities who first fixed upon the locality as a site for a Military Cantonment.

Physical conditions indicate a malaria generating surface.

7. The most casual inspection suffices to establish that the surface presents all the physical conditions necessary to the generation of those exhalations known as malaria or miasma. The site is upon the lowest level of all the surrounding country; at the bottom in fact of a broad shallow valley towards which all the drainage of the higher lands gravitates in its course towards the river. When the latter is in flood, water stands, is 'ponded' back in the ravines and nullahs, and during the rains a portion of the Cantonment—and that a most important section inasmuch as it is immediately in rear of, and in close proximity to, the Barracks of the European Infantry,—becomes flooded and is converted into a swamp.

Swampy tracts.

To remedy this, attempts were made to drain off the water into deep pits or tanks which themselves become objectionable reservoirs of stagnant water.

Drainage practicable.

8. Very recently the Executive Engineer, Mr. Johnstone, submitted, he informs me, a project for draining this locality, a measure he affirms to be as easy of execution as a work of engineering, as it is of undoubted and urgent importance as a sanitary undertaking.

Soil malarious.

9. But independent of the existence of this swampy tract, the soil itself is of a character highly favorable to the generation of malaria. It offers, in fact those conditions held to be favorable to the extrication of deleterious emanations, in a high degree, viz: an absorbent surface of great depth, highly retentive of moisture, but which during the hot season as it parts with its moisture under the influence of the rapid evaporation then in operation, opens up into gaping fissures and crevices from which watery vapours from the wet subsoil stream, and which in the cold season of the year is indicated by the fogs that wrap and bathe the lower levels. This fog level is well seen

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from the vantage ground of the Church roof, or from the high ground known as "Blogg's Drive," and is of itself an indication of the mistake that was made in locating the troops upon the present site instead of selecting the ridge* just alluded to or some equally elevated spot.

The surface generally is not, however, a dead level, but is gently undulating being higher at the east, in the neighbourhood of the Cavalry lines, than at the west end of the Cantonment. These gently swelling or undulating areas are separated from each other by the nullahs and ravines already described, which debouch into the Kanhan river, or into a rivulet called in the map the river Bagdurra which flows along the southern boundary of the Cantonment, separating it from the Sudder Bazaar or Native Town, and falls into the Kanhan at the eastern extremity of the station.

General arrangement of the section and distribution of the force.

10. As before remarked no change has been made of late years in the distribution of the troops upon the area included within Cantonment limits. Considerable alterations, improvements, and additions have, however, been made from time to time to the auxiliary and subsidiary accommodation of the European portion of the force which will be fully referred to when describing the Barracks of each arm of the force. "It may be generally stated that the whole of the Military buildings are classed as semi-permanent structures; as it is in contemplation to replace them by permanent buildings according to specimen plans now in force: and on this account it has not been considered desirable to remodel the existing buildings, or to attempt to alter them so as to meet the requirements of the present day. A great deal has, however, been done the last nine years in the way of improving them, and in constructing others which were *bona fide* wanted to meet the requirements of the European force."†

11. The Cantonment, as before remarked, extends along the right bank of the Kanhan river, and occupies a frontage of above four miles. It is arranged upon the plan of a camp, the front (the river bank) being occupied by the quarters of the Staff and Field Officers. To the rear of this line are the houses of the Captains and Subalterns; and to the rear of them again, the Barracks of European, and lines of Native, corps.

The Native Cavalry are located at the extreme right or eastern extremity; the Native Infantry Regiments in the centre, and the European portion of the force on the left, or western extremity; the Artillery on the extreme left; and the Infantry on the left centre.

Reserve Barracks, both for European and Native troops, also exist, which were constructed about the time of the mutiny on the right rear, or south eastern corner of the station. The general parade ground occupies the centre of the Cantonment near the main guard; and other private parade grounds exist in convenient proximity to Regimental lines. The Brigade exercising ground is to rear of the Sudder bazaar.

Sudder bazaar.

12. The Sudder bazaar, or large Native town is situated in rear of the centre being separated from the lines of the different Regiments by the Bagaruddy river. To the extreme left of all, the Commissariat cattle lines and store-rooms and the Native town that has grown up

* Note.—I shall have to allude further to this ridge in another part of this Report.

† Extract from letter No. 365-1616 of 8th October 1868, from the Executive Engineer, Kamptee Division, to the Superintending Engineer, Nagpore Division.

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Cattle lines.

around them, have been placed, a position which, as I shall show in a subsequent section of the Report, they ought never, upon sanitary grounds, to have been permitted to occupy.

European Hospitals.

13. The Hospitals assigned to the European force are located upon the bank of the river, at the western extremity of Cantonments.

Temple gardens.

14. Near the church a piece of ground has been enclosed, and laid out as a "public garden," and is called the "Temple gardens" in honour of Sir Richard Temple, K. C. S. I. the late Chief Commissioner of the Central Provinces, who took great interest in them. An attempt was made to form a piece of ornamental-water here. An anicut, or bund, was thrown across the Bagdurra river, and the bed of a lake formed by excavation, the soil removed being thrown up into large mounds destined to form ornamental islets. It was found, however, that the gathering grounds from which the water was collected were so foul that when stored it became so offensive that it was necessary on sanitary grounds, (and also partly because the sudder bazaar was flooded,) to cut away the bund, and allow the waters to escape. Mr. Rennick, the Deputy Inspector General of the Indian Medical Department, submitted a minute upon the subject, in which he expressed the opinion that the storage of water, collected from such polluted gathering grounds, could not fail to constitute a serious risk to the health of the community. The scheme, after a considerable expenditure, was consequently abandoned. The gardens are tastefully laid out; the water supply is abundant; and fountains have been made simply by lifting the water from wells into high level reservoirs, and laying down pipes to ornamental tanks. These gardens are maintained by a liberal grant from the Municipal funds.

Band stand.

15. The Band stand, which is situated in the centre of Cantonments near the main guard, is also laid out with taste, and receives a grant from Municipal funds in aid of its maintenance. Indeed, as I shall presently show, this Cantonment enjoys exceptional advantages from the funds, placed at the disposal of the Cantonment Committee, through the liberality of the Municipality.

Surface drainage.

16. The drainage, that is, the ordinary surface drainage for the removal by natural channels, of storm-waters, and the subsidiary drainage by means of road-side drains, of the Cantonment, may be said to be good. The natural configuration of the ground, except in one locality favors the ready escape of storm-waters, by the numerous water-courses and ravines by which it is intersected, into the rivers Kanhan and Bagaruddy. The road-side drains of all the main Cantonment roads are kept in good order; their levels are duly attended to, and no hollows in which water can collect and stagnate are to be found; while the water-ways of the bridges and culverts are kept clear and unobstructed.

Indeed the natural surface drainage aided by such artificial means as have been found necessary is good. In one locality, however, water stagnates and swampy ground is formed, and this, as before explained, is unfortunately in rear of the Barracks of the European Force, especially of the Infantry.

It has been decided that, sooner or later, the whole of the European troops shall be removed to another locality. New Barracks for the Artillery are about to be commenced. It will, however, be many years, I apprehend, before the

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Infantry are removed, and I would earnestly advocate the drainage of the swampy ground just alluded to. I have the Executive Engineer's assurance that the work is easy of execution, and that it is quite possible to reclaim this swamp, which there is every reason to believe, as I shall presently attempt to show, is one source of the malaria that originates the periodic fevers that so notoriously cripple the efficiency of the troops.

Water supply.

17. The water supply is derived almost, if not entirely from wells, sunk through the cotton soil and nodular limestone into the underlying sandstone. The river which flows along the northern limits of the station is not much resorted to, but its waters are used by some of the Native Troops, as Natives give a preference generally to river waters. The stream is considerably polluted, for as I have above remarked, the cattle lines and a large Native bazaar are situated at the west end of the station at the confluence of the Kanhan and Koolar rivers, and it is in this locality that the drainage of that bazaar, of the cattle lines, and of the European Barracks finds its way into the nullahs, and ravines, that empty themselves into the river.

Wells.

18. The wells are very numerous and yield an abundant supply. They are of great depth varying from forty to seventy feet. One situated in Brigadier General Fenwick's compound, measured fifty-two feet to level of water, and seventy-two to bottom of well; so that there was twenty feet of water. The diameter of the well being twelve and a half feet, the yield at the time of measurement would equal 2454·37 cubic feet, or 15290·72 gallons. The wells used by the Troops do not, all perhaps, yield a supply equal to this, which is exceptionally situated being close to the river, and during the hot and dry weather, those worked to supply the plunge baths occasionally barely yield the amount required; still the supply generally is abundant. It is raised by bullocks which work a revolving "drum" with two buckets, and is distributed by puckalies and beesties. In some localities, as at the Band Stand, the Temple gardens, and some private houses, it is lifted into high level reservoirs to supply fountains, which throw water to the height of four or five feet.

Analysis.

19. But one analysis has been made of the waters used by the troops.* They are somewhat hard owing to the stratum of kunkur or nodular limestone through which the wells are sunk, and, as the analysis given below shows, contain a large proportion of magnesia combined with silica as a silicate of magnesia. The water is pleasant to the taste, clear and sparkling.

The analysis made by Dr. Nicholson, R. A. is subjoined.

The station is about to lose Dr. Nicholson's services which might otherwise have been advantageously brought into requisition to make a complete standard analysis of all the waters used by the troops.

Analysis.

	Grains per Gallon.
Organic matter	0·40
Sodium (by difference.)	0·81
Lime	5·16
Magnesia	3·66
Alumina	traces.
Chlorine	1·24
Silicic Acid	6·00
Carbonic Acid (by difference.)	4·04

* Since this was sent to the Press I have received through the Military Secretary to Government a report upon the waters in use by the Royal Artillery which will be found in the Appendix.

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Analysis.

These substances are combined according to the following empirical formula.

	Grains per Gallon.
Organic matter	0·40
Chloride of Sodium	2·05
Carbonate of Lime	9·20
Silicate of Magnesia	9·98
Total solids...	21·63

No sulphuric or nitric acid—Traces of Ammonia.

General Conservancy of the station.

20. Kamptee has long enjoyed the reputation of being the best kept Cantonment in the Madras Presidency, or rather of any station garrisoned by Madras troops. It is in fact more a Bengal than a Madras Cantonment. The Department of Public Works is under the Government of India; and public health is maintained under the Bengal Municipal and Military Cantonment Acts. All questions, therefore, bearing upon the accommodation of the troops are referred through the Chief Commissioner of the Central Provinces, to the Government of India, and the periodical Returns and Reports of the working of the Municipal and Cantonment Acts are submitted through the same channel.

21. The credit of the high state of cleanliness and tidiness to which the Cantonment has been brought is given by general accord to Major Burton, formerly Quarter Master General, who first inaugurated measures of conservancy, which have been ever since energetically enforced under the general Officers who have in succession held Command of the Force. After a careful and detailed inspection of every portion of the Cantonment, it affords me much gratification to have it in my power to write, that I have seen no Cantonment yet that I can compare with this, in general cleanliness of surface; neatness and tidiness of the premises of Officers' quarters; in the care that is bestowed upon the roads, parade grounds, and all areas unoccupied by buildings; in the cleanliness of the public buildings themselves; and in the general attention paid to conservancy in all its features.

22. The station, however, enjoys exceptional advantages. The funds at the disposal of the Cantonment Committee are much larger, thanks to the liberality of the Municipality, than fall to the lot of any Cantonment in the Madras Presidency.

It is necessary to the full understanding of this subject that I should explain the system under which the Cantonment is administered in all matters relating to the public health.

The station is strictly a Military one, and is, therefore, fully and completely within the provisions of the Military Cantonment Act (Bengal) XXII of 1864.

But there is in addition a Municipal body also exercising their functions within Military limits. The Brigadier General Commanding the Force is President both of this Municipality and of the Cantonment Committee, and some of the Members of the latter, also hold office in the former. The Cantonment Magistrate is Secretary to the Cantonment Committee, and a Member also of the Municipal body.

This constitution of the two bodies, Municipal and Military, leads to harmonious working of both. The Municipality assign a liberal annual grant of Rupees 27,000 to the funds of the Cantonment Committee; and the latter undertake the entire conservancy of the station including not only that of the

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Military Lines, but of the Sudder and other bazaars. The Municipality, however, erect all public buildings out of Municipal assets. To illustrate this joint and harmonious working of the two bodies, I may state that while all public latrines and urinaries, slaughter-houses, markets, &c., are built out of Municipal funds, their conservancy and cleanliness, are maintained by the Cantonment Committee aided by the grant made by the Municipal authorities, and under the personal executive authority of the Cantonment Magistrate, who has under him a bazaar Master, and a large scavengering establishment.

Conservancy Establishment.

23. I give below a statement of the expenditure under the head of conservancy by which it will be seen that a sum of Rupees 1,604 is spent monthly by the Cantonment Committee through their Executive Officer, the Cantonment Magistrate, for the purposes of general conservancy. This sum far exceeds the assets under the Cantonment Act, and is met from the Municipal grant-in-aid, which is further devoted to the repair of roads, bridges, &c. The amount of this grant is, however, liable at any time to be altered, is in fact subject to the conditions under which Municipal funds may be raised and maintained. The Municipality further give a special grant-in-aid to the Temple gardens, Band stands, &c.

The Conservancy establishment consists of—

		RS.
Supervision......	1 Bazaar Master, or Conservancy Officer, at a monthly cost of...	175
	1 Darogah ,, ...	25
	1 Mohizir ,, ...	12
	3 Filth-Pit diggers. or Maistries	18
	26 Peons, at Rupees 6	156
	Total...	386
Establishment...	25 Rubbish Carts and hire of Bullock for Carts, at Rupees 17	425
	46 Scavengers, at Rupees 5	230
	10 Water Carts, hire of bullocks for Carts and establishment	293
	38 Filth-Pit diggers, at Rupees 5	190
	Contingencies	80
	Gross Total...	1,604

Sudder and other bazaars' population.

24. The Sudder bazaar is a very large Native town, having above 47,000 inhabitants. By the last census taken on the night of the 5th November 1866, the population within Military limits was estimated as follows :—

Civil Residents.		
Male adults	11,373	
Female do.	11,066	
Male children	5,934	
Female do.	5,114	33,487
Military.		
Male adults	5,298	
Female do.	4,241	
Male children	2,165	
Female do.	2,053	13,757
General Total...		47,244

This bazaar lies to the rear of the centre of the Cantonment, separated from it by the Bagdurra river, and upon ground gently rising to the southward.

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The distance from the Native Infantry Lines scarcely exceeds a furlong, a proximity that is certainly objectionable but now irremediable. The excellent conservancy arrangements presently to be described, that are enforced, render this proximity, however, less objectionable than it would otherwise be.

The main street of the bazaar runs in a N. N. E., and S. S. W. direction, and from this, other streets branch off at right angles. The main streets are broad, and the roads well made, high in the middle and sloping to each side along which run broad drains. The general lie of the ground is favorable to drainage, which discharges itself into the Bagdurra river, or into ravines and water courses debouching into it.

The main covered drains are large enough to admit a boy to enter them. They are unfortunately built beneath (just at the edge of), the verandahs of the houses, and to get at them to inspect them, it is necessary to remove the covering flag-stones, a measure which is a great inconvenience to house-owners. The Cantonment Magistrate wished to lay these drains all open so as to have command of them along their entire length, to ensure their thorough cleanliness; but this cannot be done without taking away from houses a portion of their frontage. There is no means of flushing the drains, which are scoured out only by natural rain-fall. I suggested to the Cantonment Magistrate the practicability of opening man-holes at given intervals, and of flushing them periodically by hand labor.

The houses of the bazaar are, many of them, of a superior description, and the whole town bears evidence of a well-to-do thriving community.

Public latrines and urinaries.

25. Latrines to the number of 48* are established in convenient localities. They are all built upon one general plan, and each has a toty or 'mehter' attached, who removes the ordure twice a day to the nearest filth-pit. The latrines are walled enclosures (unroofed) divided into small screened partitions with three seats in each, so that privacy is in a large measure secured. The "seats" are formed by low masonry walls across which the occupants squat. The mehters duly cover the deposits with earth and ashes, and remove them in baskets with a due admixture of ashes. I do not say that these latrines are perfect, but they are very well kept, less efficiently in the rains, of course, owing to their not being roofed in.

Urinaries.

26. The urinaries are small buildings at the corners or ends of all the main streets, or in localities situated with reference to the convenience of the inhabitants. They contain two urinals consisting of a saucer-shaped plate of iron with a central hole, through which the urine flows into a vessel beneath, which is capable of being removed through an arched opening in the back wall, as in latrines and urinaries made upon Dr. Hathaway's plan. These urinaries are, I think, worthy of adoption by other Municipalities.

The provisions then, made for the convenience of the people, are good, and I am assured that the practice of resorting to waste lands is most exceptional, and

* Cantonment...	18
European bazaar...	9
Commissariat do.	4
Horse Artillery do.	1
Sudder do.	14
Village of Jukera	2
Total...	48

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when detected is invariably punished by fine. I have certainly not met with any areas thus polluted, and the sense of smell has not been assailed by bad odours from this cause during any period of my inspection.

27. Filth-pits are established at suitable distances from the Cantonment and bazaars, for the deposit of night soil. These pits are under the superintendence of the Bazaar Master, and their sanitary condition is carefully attended to. But little sale is found for the contents of these pits, the value of manure of this description not being yet appreciated by the ryots. A large rubbish depôt exists to the south of the town at which there is an accumulation of town sweepings. Attempts have been made to get rid of this by combustion, but it gains head upon the authorities, and there is now an accumulation that it is highly advisable should be disposed of. I have suggested that some inexpensive kind of cinerator might be devised.

Filth-pits.

Sale of manure.

Rubbish depot.

28. In addition to the sanitary arrangements I have noted, the roads are daily swept by a staff of sweepers maintained for the purpose, and who are to be seen at work every morning collecting horse and cattle dung, litter, &c., and removing them to the rubbish depôt.

29. A large bazaar known as the European bazaar, and which is in fact quite a large village exists near the Artillery and British Infantry Lines, and to northward of them upon the banks of the river.

European bazaar.

This bazaar is under the same general conservancy arrangements as the Sudder bazaar. The main street runs N.N.W. and S.S.E., and is intersected by streets at right angles. These latter are narrow, and it is very desirable that they should be widened so as to admit of better ventilation. The further growth of this village should be strictly interdicted.

30. A third village exists at the extreme west of Cantonments, consisting of the huts of Commissariat employés, in the Cattle, Store and Camp Equipage Departments, with grass-cutters and horse-keepers of the Field Batteries of Artillery. In this locality are also found the elephant, camel, mule, and bullock lines—the whole occupying a large tract directly to windward, during a great portion of the year, of the European troops. The ground is intersected by deep ravines and nullahs into which the drainage of cattle lines, and of the village, finds its way.

Commissariat cattle lines and adjacent village.

31. The necessity for the removal of this village, and for the transfer of the cattle lines has been under the consideration of the authorities, and is one of the questions bearing upon the sanitary condition of the station, and especially of the Barracks of the European troops upon which it devolves upon me to offer an opinion.

Removal of this village and of cattle lines necessary.

After careful inspection of the locality, and taking into consideration the character of the occupants, and the defilement of air, soil, and water, almost inseparable from the conditions of occupation noted, and in consideration, also, of the fact that besides being to windward of the station during the prevalence of the westerly winds, it is situated at the confluence of the river Koolar with the Kanhan, and that all the drainage of the site finds its way into the stream at the upper end of the Cantonment, to flow past the whole station, I have no hesitation in advising that the cattle lines and bazaars should be removed. Simple

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study of the map which accompanies this report, will prove that two essential sanitary principles and requirements are violated by the location of the cattle here, viz.: (I) position in relation to the prevailing winds, and (II) set of the current of the river. Commissariat cattle lines, with the insanitary conditions inseparable from them and the dwellings of the host of people attached to that Department, should invariably be located not only to leeward of Cantonments; but "down stream" so that there can be no possibility of pollution of the water supply. A site offering these advantages has been found on the eastern extremity of the station, a site also offering every facility for drainage. I may add that the chief Commissioner, Brigadier General Fenwick, C.B, Commanding the Force, the Deputy Inspector General of the Indian Medical Department, (Dr. Rennick) and the Senior Medical Officer, Her Majesty's British Troops, (Dr. Sinclair,) fully support the views here expressed, and advocate the removal of the lines referred to. Should it be determined, in connection with the question of the fresh location of the European troops, to abandon the present Barracks, and to remove them to the elevated ground known as "Blogg's Drive," it will not be necessary to remove the cattle establishment; but if it be finally decided that the Infantry Barracks shall continue to occupy their present site, and that the new Artillery Barracks shall be but slightly removed from their present position, the translation of the cattle establishment becomes, I consider, a sanitary measure of primary importance.

The entire removal of the lines of the horse-keepers and grass-cutters of the Light Field Batteries from the locality, cannot be enforced as they must of necessity be near the horses, but it is possible to select a better, though equally convenient, site and to give them an improved description of dwellings which are now most wretched hovels. This, I am informed, it is the intention of Government to do, bearing wholly or in part the expense of new lines, when the new Barracks about to be commenced are completed.

Slaughter-houses.

32. Slaughter-houses are provided in different localities in connection with the Sudder and European bazaars. These buildings consist merely of walled enclosures, without roof, with paved floors. They are capable of, and indeed require, improvement. The floors of those I inspected are so badly flagged, and are so much out of repair that blood, &c., sinks through and saturates the soil. They are not provided with any gutter to carry off blood and washing waters, or pit for the deposit of offal. They are, however, cleaned out daily, and the offal removed, and buried at a distance.

I have suggested to the Cantonment Magistrate who accompanied me in my inspection, and to whom I have to offer my acknowledgments for the information he imparted to me, upon all matters connected with the conservancy of the station that these enclosures should be repaved, the joints be made water-tight, and the flooring laid at a gentle slope towards a central asphalted gutter leading to an asphalted reservoir to receive all blood, offal, and washing waters prior to removal.

The Contractor, for the supply of meat to the troops, has a slaughter-house for his sole use on the same plan, but provided with a shed in which to hang the meat. I inspected this slaughter-house in company with Major Moore. It consists of two walled enclosures one for slaughter of oxen, the other of sheep. Both were simply filthy, and the floor of the shed is saturated with blood and filth. This

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slaughter-house should be at once abandoned, and a new one, upon the standard plan, built. Brigadier General Fenwick is about to move in the matter, and to urge the erection of a new building, which has been duly provided for in the budget.

Markets.

33. There is at present no public market place. Next year, however, the Municipality contemplate building a vegetable market at the entrance of the Sudder bazaar, opposite the Bazaar Master's house. This building is to be of a crucial shape, and to be constructed principally of iron, much of the material being imported from England.

Meat Markets.

General Market.

34. At present the sale of meat is restricted to certain streets, separate lines of sheds, (the verandahs of houses) being assigned to mutton and beef butchers. The sale of pork is prohibited. The general market is held in the open air upon raised platforms of earth faced with stone, laid out with broad streets and planted with trees. The site is marked "Market place" in the map, and is extensive, and kept scrupulously clean.

Roads.

35. The main roads throughout the station are very good. They are wide and metalled with kunkur, or, in some instances, with gravel. The main lines are watered daily, and a staff of sweepers is entertained, whose duty it is to sweep them daily removing all litter, cattle dung, &c., to the various rubbish depôts.

Means of communication.

36. The opening of the rail to Bombay places this station in direct and easy communication with the coast, while the completion of the line joining Bussawul with Jubbulpore will eventually and at no distant period render the periodical reliefs of the Troops facile. Long tedious marches, and the more modern means of conveyance by 'transit' carts, will then become obsolete.

Communication by rail has entirely changed the conditions of the station. Formerly it was so isolated that sick and invalid soldiers could only be transferred to the coast at great inconvenience and even risk, and in consequence many succumbed to the climate, whose lives could have been saved by timely change of air. Now, transfer to the coast can be effected at any time, and although the invalids of the season are usually sent away at the close of each year only, change *can* be given at any moment in urgent cases of sickness. Advantage, however, does not appear to be taken to the extent it should be of this facility for change to soldiers labouring under grave illness. This facility of communication will doubtless effect a vast alteration in the returns of mortality that have hitherto been recorded against this station. The influence of the climate must, in fact, not be deduced for the future from the returns of mortality so much as from the numbers 'constantly sick' and those 'invalided' at the close of each year for change of climate or discharge.

With the progress already made in railway communications it is not necessary to allude to the communications by road. European troops moving from any part of India to this station will make the greater part of the journey by rail, which will also doubtless be largely utilized in the relief of Native troops, as is being done at the time I write, in the transfer of the 1st Light Cavalry from Poonah.

Rest-houses and camps.

37. Upon the lines of rail rest-houses and camps have been formed at convenient distances for the use of troops on the move.

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Special trains are usually ordered for the conveyance of troops, which move only during the night; halting during the day at the camps or rest-houses.

Between this and Bombay there are three of these halting stations one at Deololee, one at Bussawul junction, and one at Akola. At the former, barracks have been built, and permanent barracks are also being constructed at Akola, under the orders of the Resident of Hyderabad within whose jurisdiction, Akola is located.

The arrangements made by the Quarter Master General's Department at Bombay for the transport of troops are very efficient and at this station (Kamptee) the organization for their further transit to Jubbulpore is very complete.

Every provision is, in fact, made that prudent forethought could devise for the comfort and convenience of troops passing through this station on their way to and from the coast or forming part of the relieving Force.

38. Kamptee is apparently destined to become a less permanent station than it has hitherto been. Regiments under orders for home are now sent here the year previous to embarkation, so that there will be little inducement for them to settle down. This must re-act upon the Cantonment, as Officers cannot under these circumstances be expected to pay any attention to the preimses of their quarters, or to cultivate gardens, and the soldiers' gardens will be equally neglected. Already these conditions are beginning to make their mark. The Regiment which has just left did little towards keeping up its gardens, and officers' houses begin to show signs of neglect to the detriment of the reputation, the station has hitherto, and still enjoys for its good order and cleanliness.

Climate.

39. The climate of the Nagpore Province generally is characterized by considerable seasonal and diurnal ranges of temperature—by very high *day* temperature during the hot, and a low *night* temperature during the cold season—by a great prevalence of calms, and a moderate rain-fall.

The following description is taken from the Gazetteer of the Central Provinces for 1867, Part IV, Nagpore, page 234.

Climate and seasons of Nagpore.

"The mean temperature is higher than in many other parts of India of the same height above sea level. But the absence of the real bracing air in the cold season for upper India, is in some degree compensated for by fresh cool weather during the greater part of the monsoon, and by tolerably cool nights in the summer months.

"The following table gives the temperature for the last twelve months :—

Months.	Maximum.	Minimum.	Mean.
1866.			
June	112	73	81·7
July	97	70	81·7
August...	90	73	80·5
September	97	65	81·
October	97	59	78·
November	88	54	71·
December	85	48	66·
1867.			
January	92	52	71·1
February	96	53	75·
March	106	63	84·5
April	109	64	88·6
May	113	70	93·5

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"As in other parts of India there are three seasons,—the hot, the cold, and the rainy. The positively hot weather ordinarily commences about the 1st of April, and last till the first week in June. The monsoon lasts throughout June, July, and August. At this season the climate, though full of moisture, is fresh and pleasant to the feelings. In September there are long breaks between each fall of rain, when the weather is often close and sultry, though never so much so as in the plains of the north of India at this time. October is generally sultry and unpleasant, but diversified occasionally by refreshing showers. The cold weather does not fairly set in till the middle of November. From the 15th of November to the end of February, the air is generally cool and pleasant. Often, however, with the appearance of clouds, the thermometer rises as much as seven or eight degrees, and the climate becomes disagreeable and close. From the 15th of February, the weather gets warmer and the hot winds blow from the beginning of April till the monsoon.

"Rain falls during every month in the year, usually during the hot and cold season, only in showers, but sometimes accompanied with violent storms. Hail falls occasionally in January, February and the early part of March, sometimes in very large stones, doing much damage to the spring crops.

"It is considered that the average annual rain-fall, taking a great number of years back, is about 40 inches.

"The following table gives the rain-fall during the last three years :—

Months.	1864.	1865.	1866.
January	2·04	...	...
February	...	1·56	...
March	...	2·59	...
April	·50	1·22	...
May	1·95	1·27	...
June	7·34	10·22	6·10
July	9·70	10·77	10·10
August...	10·46	8·33	14·42
September	3·45	3·32	8·89
October	...	1·75	1·40
November	0·15	·14	...
December	...	·46	·20
Total ...	35·59	41·63	41·11

"The climate during the rains is considered by the poorer inhabitants, who are exposed to it, as more trying than the cold of the real cold weather. In July and August, it is not unusual to see people sitting round a fire in the very early morning before going out for their day's labor.

"The climate is certainly not unhealthy. But the late collection of vital statistics has not been extended generally enough to make possible any comparison of deaths with population for the entire district. Fever is the most frequent amongst the epidemic diseases. The most unhealthy season is from the second week in September, till the second week in December. The jungle tracts are certainly not free from malaria until the cold weather has well set in; and during the greater part of November it is decidedly feverish in camp. Epidemic cholera occurs occasionally. In 1865, there were a large number of deaths from this disease. Small-pox, too, occurs at intervals, but lately its ravages have been materially lessoned by vaccination."

Meteorology.

40. No reliable meteorological records are available. Observations have, it is true, been taken at the Hospital of the Royal Artillery for some years past; but the instruments are not complete, and those in use have not been placed under conditions necessary to accurate registration. Through the courtesy of Deputy Inspector General, Mr. Rennick, I am in possession of the records for the past seven years from which I framed a series of tables but they possess such little scientific value that I do not reproduce them here. I give, however, a few deductions from them from 1862 to 1866.

I. Highest day temperature in shade. This ranges from 113° in May, to 78° in December.

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II. The lowest temperature in shade is 43° in December.

III. The *mean* monthly maximum temperature has ranged from 71° in December, to 109·5° in May.

The tables illustrating monthly and diurnal ranges of temperature in the shade, are so manifestly inaccurate as to be undeserving of record. The approximate mean temperature for the year as deduced from the tables is 83°. The average rain-fall would appear to be about 38 inches.

The months of March, April, May, and part of June, are most trying. In May the temperature for days together stands at 112-113°, and on occasions 114 degrees, with a stagnant atmosphere. No relief is experienced even at night, and it is only for the hour or two preceding sun rise, that houses can be opened, or means in use for cooling the air be intermitted. In the cold season on the other hand the night temperature fall as low as 42°, and the feeling of cold is more intense than the thermometer indicates.

The climate then is, from its extremes, a very trying one as the next paragraph will illustrate.

Medical history of the Station.

41. Kamptee does not enjoy a good reputation for salubrity in reference either to the European or Native constitution. It is notorious for the prevalence of fever known as Kamptee or Nagpore fever, and formerly for 'apoplectic' seizures (insolatio and heat apoplexy) the effect of high temperature and a stagnant atmosphere with over-crowding. Formerly this fever often presented the features of a grave remittent, or as it was sometimes termed a continuo-remittent; but of late years, owing doubtless to improvement in the general sanitary condition of the station it has assumed a milder intermittent type, while the better treatment of the disease within recent periods has robbed it of the fatality that formerly attended it. It is, however, undoubtedly still very prevalent towards the close of, and after, the rains. Opinion has varied as to the cause and sources of this fever. The writer of the report before alluded to in the volume of topographical reports by the late Medical Board of Madras, attributes its prevalence to tracts of jungle both dense and extensive some twenty or thirty miles away, though he admits that since the transfer of the troops from Nagpore to Kamptee, by which they were brought ten miles *nearer* to the heaviest part of the jungle, Europeans as well as Natives have generally suffered less from sickness than in the position first taken up, and he attempts to account for this, "by the deleterious principle of the jungle atmosphere becoming diluted or dissipated in the open country lying round the lines of the new Cantonment." This opinion is, however, opposed to all we now know of the diffusion of malaria, and we must look to some sources of the prevalent fever nearer home.

I have already said that the station, from its locality upon the banks of a river at the bottom of a basin, and from the nature of the soil, contains in itself the elements of malaria; offers in fact all the physical conditions necessary to its generation. What share the exposed bed of the river may have in the causation of the fever that prevails after the rains, I do not stop to enquire, suffice it to say that fever does exist, and in the words of the late Inspector General Dr. Macpherson it may safely be affirmed that the "constant recurrence of fever at

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this station is due far more to local causes than to those proceeding from a distant source." I have already alluded to the dense fog or mixture of watery vapour-smoke and dust which in a stagnant condition of the air envelopes the Cantonment, as seen from any elevated site, as from the ridge known as "Blogg's ride." This fog-line is defined. As viewed from the vantage ground first named, it may be often seen veiling the barracks of the European force, the roofs of which just appear above its level. It has been advanced by eminent sanitary authorities that the determination of this 'fog-level' is one of the first duties in the selection of a site, in view to the disposition of buildings above it; and if the location of troops at this station had been settled upon this consideration, the present position would not have been selected.

Statistics.

42. If we turn to the topographical report by the late Medical Board, we find that out of an aggregate strength of 9,574 European troops stationed at Kamptee for the ten years from 1829 to 38 inclusive there were 7,304 admissions into Hospital by fevers alone, or in the ratio of 762·9 per 1,000 of strength; or in other words more than three-fourths of the force passed through the Hospital for fever alone. But there are other diseases also influenced by malaria as diarrhœa, dysentery and hepatitis; so that in order to ascertain how far the station merits the evil reputation it has acquired from the prevalence of diseases caused by malaria, it is necessary to compile statistical tables for as many years back as are available. I have done this, and arranged them in forms which will enable the Government to see, not only the extent of prevalence of this fever amongst the troops both European and Native; but also to trace the declension (if any) of late years attributable to sanitary improvements.

The following table exhibits some of the leading points of enquiry extending from the year 1828 to the present period. The sources from which I have obtained the information do not enable me to break up the table into periods of equal duration; but its arrangement enables me to compare past with more recent periods, and thus to trace the increase or diminution of the prevalence of diseases attributable to malarious influences.

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EUROPEANS.

Table I.

Admissions and Deaths amongst European Troops stationed at Kamptee.

Periods.	Aggregate strength.	Total admissions.	Total deaths.	Ratio per mille, of Admissions.	Ratio per mille, of Deaths.	Admissions and Deaths by specific Diseases: Fevers A.	Fevers D.	Diarrhœa A.	Diarrhœa D.	Dysentery A.	Dysentery D.	Cholera A.	Cholera D.	Hepatitis A.	Hepatitis D.	Ratio per mille to strength: Fevers A.	Fevers D.	Bowel complaints A.	Bowel complaints D.	Cholera A.	Cholera D.	Hepatitis A.	Hepatitis D.	Remarks.
Ten years from 1829 to 1838	9,574	23,092	377	2411·94	39·37	7304	81	742	17	1413	76	153	39	1192	35	762·89	8·46	225·08	9·71	15·98	4·07	124·50	3·65	From Medical topographical report, *Vide* table at page 151.
Sixteen years from 1842 to 1857-58	8786·75	17,544	326	1996·3	37·1	...	...	...	...	...	...	...	37	...	...	...	...	...	...	...	4·21	...	...	From Royal Commissioner's Report, page 660 (Appendix.)
Ten years from 1858-59 to 1859-60, and from 1861 to 1868, (11 months)....	10,308	*14,140	*171	*1371·75	*16·58	5477	16	525	4	424	20	82	49	624	28	531·43	1·55	92·06	2·32	7·95	4·75	60·53	2·71	For 1858-59 and 1859-60, from the Royal Commissioners Report, page 374. From 1861 to 1868, from Return furnished by Deputy Inspector General Rennick of the Indian Medical Department, dated 19th December 1868.
1868 (from 4th January to 11th December 1868)....	896·25	1,416	†19	1579·91	21·19	448	1	58	...	24	...	7	5	66	3	499·86	1·11	91·49	...	7·81	5·57	73·64	3·34	From return, dated 8th Dec. 1868, furnished by Senior Medical Officer, British Service, at Kamptee.

* For the years 1858-59 and 1859-60, the following specific diseases only are taken. Fevers, Hepatitis, Rheumatism, Dysentery, Cholera, Diarrhœa, and Syphilis.

† Two out of Hospital.

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During the ten years from 1829 to 1838, the admissions by all diseases were in the ratio of 2411·94 per mille of strength. In the sixteen years from 1842 to 1857-58, the ratio fell to 1996·3. During the period from 1858-59 to 1868 (eleven months) the ratio fell still further, or to 1371·75 per mille. A very gratifying declension in the prevalence of "all diseases" is, therefore, traceable in recent, as compared with more remote, periods.

In the mortuary rate also an equally gratifying declension is traceable; the figures for the three periods noted above expressed in ratios per mille of strength being 39·37, 37·1, 16·58. The death rate in the last ten years is more than one-half less than that marking the first ten years. The admissions by disease also fell to the extent of 1040·19 per mille! If we trace the declension in the more important diseases, it is found that fevers, bowel complaints, cholera, and hepatic affections, though all shewing a great fall, have not declined in equal ratios. This is best shewn by the subjoined figures.

Diseases.	Ratio per mille of strength.					
	Ten years from 1829 to 1838.		Ten years from 1858-59 to 1868 (eleven months.)		Difference.	
	A.	D.	A.	D.	A.	D.
Fevers	762·89	8·56	531·43	1·55	—231·46	—7·01
Bowel complaints	225·08	9·71	92·06	2·32	—133·02	—7·39
Hepatic affections	124·50	3·65	60·53	2·71	—63·97	—0·94
Cholera	15·98	4·07	7·95	4·75	—8·03	+0·68

The disease (fever) more immediately attributable to malarious influences, has not experienced a declension of prevalence in so great a ratio as bowel complaints and hepatic affections; but the yearly reduced mortality manifests the alteration of type (and better treatment of the disease) and a loss of that virulence that characterized it years ago. Its occurrence in the ratio of 531·43 per mille of strength (rather over one case to every two men) sufficiently proves that malaria is rife in the station.

The table given below for the eight years from 1861 to 11th December 1868 exhibits the annual admissions and deaths by a few of the more important diseases. Fever was very prevalent in 1867, the admissions equalling 852·5 per mille of strength, so that although a most gratifying improvement is traceable in the sanitary condition of the troops, there is undeniable evidence that the causes of malarious fevers exist in great activity (in greater activity I shall presently shew than in any other station of the Madras Army garrisoned by British Troops) and these causes as I have elsewhere advanced reside in the topographical position of the station, and the physical conditions of its soil and surface.

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EUROPEANS (KAMPTEE.)

TABLE II.

Years.	Average strength.	Admitted and died by												Ratio per mille to strength.											
		Fevers.		Diarrhœa.		Dysentery.		Cholera.		Hepatitis.		All diseases.		Fevers.		Diarrhœa.		Dysentery.		Cholera.		Hepatitis.		All diseases.	
		A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
1861 ... ... (a)	1175	572	2	32	...	48	3	1	...	46	4	1583	15	486·80	1·70	27·23	...	40·85	2·56	0·85	...	39·14	3·40	1347·23	12·76
1862 ... ... (a)	1205	962	1	38	...	46	5	12	11	34	3	1938	30	798·34	0·82	31·53	...	38·17	4·14	9·95	9·12	28·21	2·48	1608·29	24·89
1863 ... ... (a)	1648	821	1	63	...	60	1	5	1	110	5	2101	17	498·17	0·60	38·22	...	36·40	0·60	3·03	0·60	66·74	3·03	1274·87	10·31
1864 ... ... (a)	1598	947	4	76	1	50	1	30	14	155	3	2788	35	592·61	2·50	47·55	0·62	31·28	0·62	18·77	8·76	96·99	1·87	1744·68	21·90
1865 ... ... (a)	1421	723	1	59	1	58	2	16	12	136	8	2285	32	508·79	0·70	41·52	0·70	40·81	1·40	11·25	8·44	95·70	5·62	1608·02	22·51
1866 ... ... (a)	1194	680	4	69	1	29	1	1	1	88	3	2023	18	569·51	3·35	57·78	0·83	24·28	0·83	0·83	0·83	73·70	2·51	1694·30	15·07
1867 ... ... (b)	1011	862	1	42	...	56	...	...	...	54	2	1924	9	852·5	0·9	41·5	...	55·3	...	...	...	53·4	1·97	1903·06	8·90
1868 (from 4th January to 11th Dec. 1868) (c)	896·25	448	1	58	...	24	...	7	5	66	3	1416	19	499·86	1·11	64·71	...	26·77	...	7·81	5·57	73·64	3·34	1579·91	21·19

(a.) Obtained from Returns dated 19th December 1868, furnished by the Deputy Inspector General, Indian Medical Department, Nagpore Force,

(b) Obtained from the Annual Report of the Sanitary Commissioner for Madras, for 1867, Appendix page 10.

(c.) Obtained from Returns dated 18th December 1868, furnished by the Senior Medical Officer, British Service at Kamptee.

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NATIVES.

Table A.

Admissions and Deaths amongst Native Troops stationed at Kamptee.

Periods.	Aggregate strength.	Total Admissions.	Total Deaths.	Ratio per mille, to strength of		Admissions and Deaths by specific diseases.																				Remarks.
																Ratio per mille to strength of.										
				Admissions.	Deaths.	Fevers.		Diarrhœa.		Dysentery.		Cholera.		Hepatitis.		Fevers.		Bowel complaints.		Cholera.		Hepatitis.				
						A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.			
Ten years from 1829 to 1838	49,318	30,765	619	623·87	12·55	17,609	217	536	18	233	25	148	87	37	8	357·08	4·40	15·59	0·87	3·00	1·76	0·75	0·06			From Medical Topographical Report, *Vide* table following page 151.
Sixteen years from 1842 to 1857-58	74976·75	48,139	1,027	642	13	...	...	...	...	...	...	...	322	...	...	...	...	...	...	...	4·29	...	...			From Royal Commissioner's Report, page 660, (Appendix.)
Ten years from 1858-59 to 1859-60, and from 1861 to 1868 (eleven months)... ...	32,372·5	*33,894	*435	*1046·99	*13·48	19,739	111	973	12	813	37	393	152	48	5	609.74	3·42	55·17	1·51	12·13	4·69	1·48	0·15			For 1858-59 and 1859-60, from the Royal Commissioner's Report, page 374. From 1861 to 1868, from Returns furnished by Deputy Inspector General Rennick of the Indian Medical Department, dated 19th December 1868.

* For the years 1858-59 and 1859-60, the following specific diseases only are taken:—Fevers, Hepatitis, Rheumatism, Dysentery, Cholera, Diarrhœa, Syphilis.

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NATIVES.

Table B.

Years.	Average strength.	Admitted and died by: Fevers. A.	D.	Diarrhoea. A.	D.	Dysentery. A.	D.	Cholera. A.	D.	Hepatitis. A.	D.	All Diseases. A.	D.	Ratio per mille to strength of: Fevers. A.	D.	Diarrhoea. A.	D.	Dysentery. A.	D.	Cholera. A.	D.	Hepatitis. A.	D.	All Diseases. A.	D.
1861 ... ... (a)	3,417	1,030	9	40	1	48	1	2	...	3	...	2,074	19	301·43	2·63	11·70	0·29	14·04	0·29	0·58	...	0·87	...	606·96	5·56
1862 ... ... (a)	2,354	1,448	4	82	...	85	2	40	15	2	...	2,818	26	615·12	1·69	34·83	...	36·10	0·84	16·98	6·37	0·84	...	1197·11	11·04
1863 ... ... (a)	3,727	2,031	8	106	2	75	1	99	40	2	...	3,966	69	544·91	2·14	28·44	0·53	20·12	0·26	26·56	10·73	0·53	...	1064·12	18·51
1864 ... ... (a)	3,704	2,175	12	95	...	77	1	68	23	10	...	4,221	49	587·20	3·23	25·64	...	20·78	0·26	18·35	6·20	2·69	...	1139·57	13·22
1865 ... ... (a)	3,725	2,724	10	126	2	159	2	55	25	6	...	4,851	59	731·27	2·68	33·82	0·53	42·68	0·53	14·76	6·71	1·61	...	1302·28	15·83
1866 ... ... (a)	3,940	2,978	15	111	1	130	2	4	1	8	1	4,537	35	755·83	3·80	28·17	0·25	32·99	0·50	1·01	0·25	2·03	0·25	1151 52	8·88
1867 ... ... (a)	3,759	2,024	16	101	1	83	2	...	...	5	...	3,603	35	538·44	4·25	26·86	0·26	22·08	0·53	...	...	1·33	...	958·49	9·31
1868 (eleven months) (a)	3,127	1,565	12	101	3	53	...	30	11	4	1	2,845	47	500·47	3·83	32·29	0·95	16·94	...	9·59	3·51	1·27	0·31	909·81	15·03

(a) Obtained from Returns dated 19th December 1868, furnished by the Deputy Inspector General, Indian Medical Department, Nagpore Force.

Native Troops.

43. The tables I have compiled for Native troops equally show a large prevalence of fever, and do not exhibit that declension traceable in the European returns. Indeed the ratios of admissions and deaths in recent periods are in excess of those that were recorded years ago. In the first ten years the ratios were 623·87, (admissions) and 12·55 (deaths). In the next sixteen years they were 642 and 13 while in the ten years including eleven months of the past year, they rose to 1046·99 and 13·43. Fevers alone increased from 357·08, in the first ten years of the table, to 609·74 in the more recent decennial period. Indeed in all points embraced in the table, the health of Native troops has been less satisfactory of late years, especially as relates to the prevalence of fevers and bowel complaints. The Native soldier has not benefited to the same extent as his European comrade, which goes far to prove that the improved condition of health of the latter is due more to the improvements made in his barrack accommodation, embracing principally space and ventilation, and in sanitary supervision and general conservancy, than in any removal of those conditions of soil, upon which malarious exhalations depend. In point of fact Kamptee must still be pronounced to be eminently malarious, a conclusion that gravely affects the question of location of the new barracks designed for the accommodation of of the European portion of the force.

Contrast of prevalence of intermittent and remittent fevers at Kamptee with other stations.

44. The subjoined tables illustrate the great prevalence of fevers of the malarious type at this station in contrast with other stations, I have added a table showing the extent of invaliding, not from these diseases alone, but from all causes which exemplifies still further the influences of the climate of Kamptee upon the European constitution.

Table showing the comparative prevalence of Fevers in the undermentioned Stations occupied by European Troops.

Stations.	1866. Per mille. A.	1866. Per mille. D.	Stations.	1867. Per mille. A.	1867. Per mille. D.
Seetabuldee	600·0	...	Seetabuldee	909·0	0·9
Kamptee	562·3	2·8	Kamptee	849·6	0·9
Penang	391·8	...	Port Blair	354·5	0·4
Port Blair	284·4	...	Tonghoo	293·9	5·0
Trichinopoly	204·5	...	Cannanore	171·3	...
Saint Thomas' Mount	156·7	2·2	Secunderabad	155·1	0·4
Secunderabad	107·8	1·4	Thayetmyoo	152·5	...
Tonghoo	126·5	...	Trichinopoly	146·9	...
Vizagapatam	93·7	10·4	Rangoon	101·7	...
Singapore	73·5	...	Bellary	96·5	...
Bellary	70·5	...	Calicut	89·8	...
Palaveram	70·0	...	Malliapooram	87·3	...
Bangalore	62·9	...	Saint Thomas' Mount	59·3	...
Thayetmyoo	54·8	...	Bangalore	44·1	...
Cannanore	53·2	...	Fort Saint George	34·2	...
Rangoon	15·8	2·8	Penang	25·6	...
Calicut	11·7	...	Palaveram	15·7	...
Fort Saint George	4·4	...	Singapore	13·8	...
Malliapooram	...	...	Vizagapatam	12·9	...

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Return showing the comparative prevalence of Fevers in the undermentioned Stations occupied by Native Troops.

Stations.	1866.		Stations.	1867.	
	A.	D.		A.	D.
Singapore	971·4	...	Seetabuldee	842·5	3·8
Seetabuldee	910·9	...	Port Blair	719·0	4·7
Secunderabad	646·4	1·9	Secunderabad	700·6	2·1
Kamptee	644·6	4·7	Singapore	695·7	1·7
Saint Thomas' Mount	366·7	...	Tonghoo	593·4	1·9
Palaveram	267·0	11·2	Kamptee	449·9	1·9
Port Blair	256·5	...	Bangalore	356·0	1·1
Bellary	171·6	2·6	Palaveram	228·5	7·1
Rangoon	160·5	...	Saint Thomas' Mount	164·8	...
Bangalore	145·4	3·1	Fort Saint George	151·8	0·9
Tonghoo	143·5	3·5	Vizagapatam	134·5	...
Fort Saint George	125·7	1·3	Bellary	124·1	0·5
Penang	117·7	2·1	Rangoon	75·2	...
Thayetmyoo	95·9	...	Cannanore	60·6	...
Vizagapatam	95·0	...	Penang	41·4	...
Cannanore	56·2	0·7	Thayetmyoo	26·9	1·4
Trichinopoly	26·5	0·7	Trichinopoly	20·7	...

Return showing the comparative rate of Invaliding at the undermentioned Stations amongst British Troops.

Stations.	1866.	Stations.	1867.
Kamptee	116·1	Thayetmyoo	114·4
Madras	86·3	Rangoon	113·0
Bellary	74·0	Saint Thomas' Mount	86·0
Secunderabad	72·5	Madras	80·6
Rangoon	67·8	Cannanore	69·5
Thayetmyoo	67·2	Kamptee	55·6
Cannanore	56·1	Secunderabad	52·9
Trichinopoly	45·4	Bellary	50·4
Penang	40·5	Singapore	46·7
Bangalore	35·2	Trichinopoly	37·7
Saint Thomas' Mount	22·0	Bangalore	34·9
Singapore	14·7	Tonghoo	7·5
Tonghoo	4·4		

Sanitarium.

45. Chindwarrah is the sanitarium of the station, but from information I have acquired it scarcely comes up to the requirements of a sanitarium. Its elevation is insufficient, and although residence there during the hot weather constitutes a relief from the intense heat of Kamptee, hot winds, necessitating the use of wet tatties, are experienced. The climate in fact is not sufficiently restorative and bracing for a sanitarium, while the means of access are by no means good.* It was suggested to me by Brigadier General Fenwick, C. B., Commanding the Force, that the range of hills to the north of Ellichpoor, known as the Chiculda hills, and which have for years past been resorted to by Officers of the Hyderabad Contingent, would be better suited as a sanitarium, especially as the railway has brought them within easy access.

* Since the above was in type I have received from Dr. Grylls in Medical Charge of Chindwarrah a Memorandum upon that Station, which will be found in the Appendix.

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I consequently determined to visit them. The result of my visit is detailed in a special report submitted to Government on the 23rd of February, and which will be found in the Appendix. It will be seen that I considered myself fully justified in recommending that the sanitarium should be established there, instead of at Chindwarrah.

Rations, &c.

46. The rationing of the Troops by the Commissariat, is under the regulations in force in the Madras Presidency. The *meat* ration is reported to be generally good, especially the beef, which is always better than the mutton. The *vegetable* ration is often complained of, and occasionally difficulty is experienced in the hot season in supplying the regular ration. The potatoe sometimes falls short, and bread is issued in lieu of it. Medical Officers complain that the country vegetables issued are not used by the men. They do not appreciate the brinjall or bandykai, which when cooked, as served to the officers' table, are palatable vegetables, but which the barrack cooks do not dress to please the taste of the soldier. During the time of my inspection vegetables of all kinds were plentiful. In Officers, and in the Public (Temple) gardens at that time of the year, European vegetables attain great perfection. I never saw finer cauli-flower nor cabbage. These vegetables are not, however, issued to the troops. Considering the perfection to which they grow, I certainly see no reason why they should not form part of the vegetable ration, during that portion of the year at which they are procurable. I have elsewhere stated that the soldiers' gardens, to which the authorities partly look for supply, were not under cultivation.

A Government garden under charge of the Commissariat Department desirable.

47. But if the Government would sanction the establishment of a garden, under the supervision and management of the Commissariat Department, the vegetable ration could be much improved. I understood from the Commissariat Officer, that a few years back, a garden of this description existed, and that it was cultivated by the Commissariat bearers and other employés of the Department; but that it was suppressed under instructions from Madras. It was ruled that the pay of all men employed in the garden was to be debited to the cost of the institution. This raised the cost price of the vegetables produced to such a figure that the garden was held "not to pay," and it was closed. But many of the Commissariat employés have much leisure time at their command, and as a fixed establishment must at all times be kept up, it would be good economy I think to allow them to be employed in garden work of this nature, giving authority to the Commissariat Officer to supplement their labor by a few hired laborers at such times as there may be any unusual demand for their services in other directions.

A Government garden is, I think, a great desideratum at this station.

Bakery.

48. A Government building exists which is let to a contractor who supplies the bread on contract. The bread itself is wholesome and good, but complaint is frequently made of its grittiness from admixture of sand and dust. Major Moore, the Commissariat Officer is very dissatisfied with the system, because in the first place the bakery merely provides accommodation for mixing and baking the bread, while it has no rooms attached to it, for the grinding and storage of wheat and flour. Secondly, the bread is fermented by a mixture of ingredients, known as "Mussal" of the composition of which he is entirely ignorant,

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He strongly urges, that the bakery be extended, that accommodation be found for storing and grinding the wheat, and that the whole process of making the bread, be placed under his supervision in supersession of the present system of contract.

On my visit to the bakery I found the building far from clean, and deficient in means and appliances for kneading the dough, and placing the bread to cool after removal from the ovens. The tables were not so clean as they should be, the floors were dirty, and the bread was placed to cool upon the floor of a room insufficiently ventilated.

Slaugter-houses.

49. The slaughter-houses I have already said are Municipal. The condition in which I found them is described at page 10 paragraph 32. Brigadier General Fenwick has brought to notice the necessity of the provision of new buildings.

Main Guard.

50. The Main Guard is situated in a very central position between the Native Infantry Lines at the western end of the general parade ground close to the Band Stand. The buildings comprise an officer's and men's guard-rooms with a block used as public offices.

The Guard-rooms are built upon similar plans, and are ill ventilated and insufferably hot. I give a plan of the men's guard-room which sufficiently illustrates the objectionable nature of its construction. Without entering into a detailed description suffice it to say that it was originally a bomb-proof or vaulted-roofed building, comprising three rooms, and surrounded by buttresses enclosing arched communications with the rooms. Subsequently a terraced roof with ventilating shafts, of far too small a diameter, and terraced verandahs were added to protect the building from the direct rays of the sun, and to improve ventilation. But the rooms are still close and ill-ventilated, and I have no hesitation in saying that a new men's guard-room for Europeans upon an approved plan in two stories, for the accommodation both of the officer and men is much needed, and should be provided so soon as the question of the location of the new European barracks is decided. The new building might with advantage combine the guard-rooms for officers and men, a Court Martial-room and public offices, the latter below, and the guard-rooms in an upper story.

51. In the mean time something should be done to improve the ventilation of existing buildings. This may be best done at small cost by enlarging the ventilating apertures in the roof to an extent that will give a sectional area of 2 inches for every 20 cubic feet of space as ruled by the Government of India in relation to the capacity of air-shafts. This will necessitate each air-shaft being increased to about 15 × 15 inches, two of such diameter for the large, and one for each of the smaller rooms.

The doors and windows should also be improved. The former should be half glazed and have ventilating apertures closed by perforated zinc-plates in the lower pannels. The windows should be glazed, and the upper panes be furnished with perforated zinc instead of glass. This arrangement would ensure the admission of air in finely divided currents, at those seasons when it may be necessary to shut the doors and windows to exclude either cold or hot winds. The expense attendent upon these alterations would be small, and the health and comfort of the men would, I consider, be materially improved thereby.

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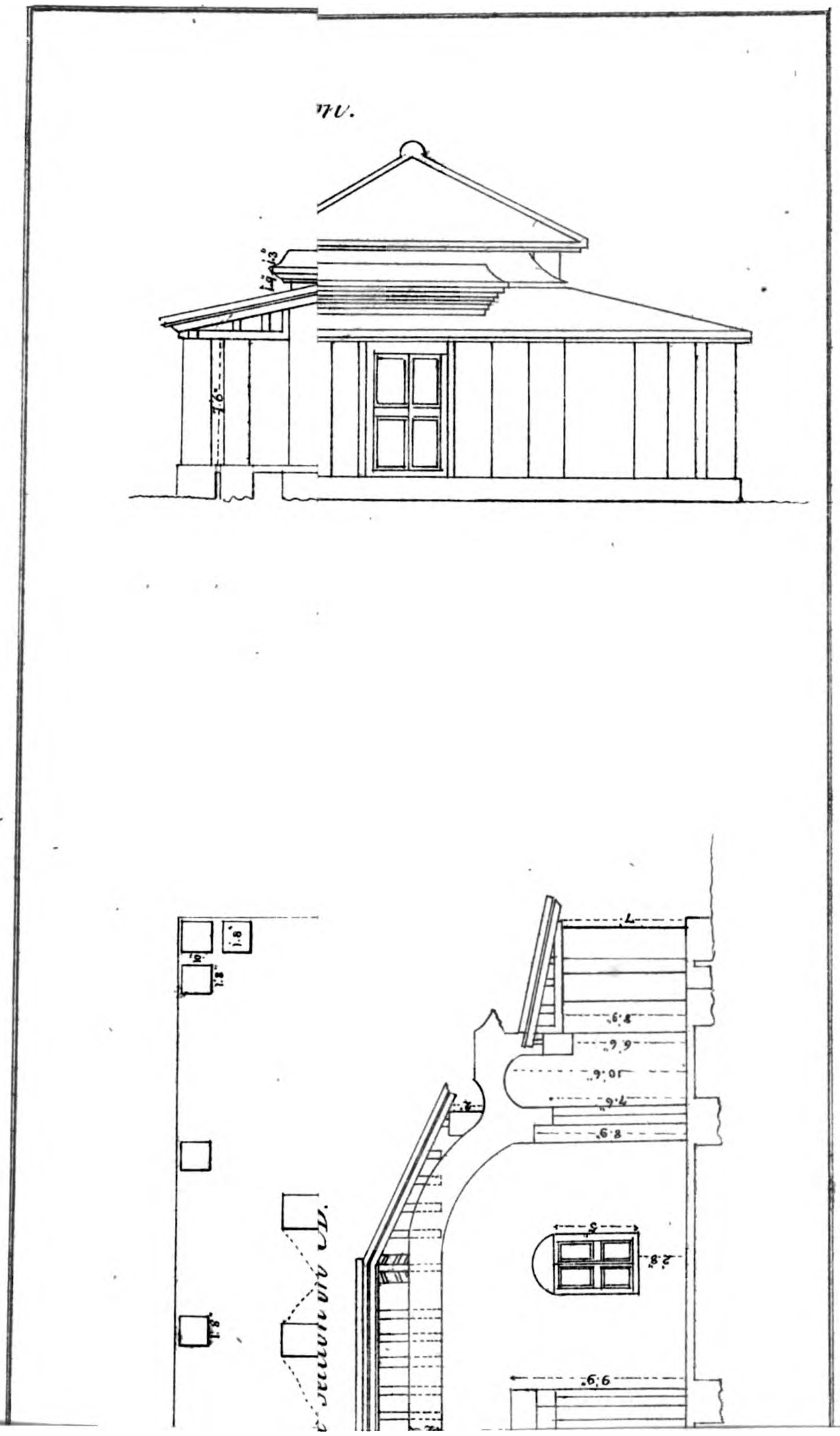

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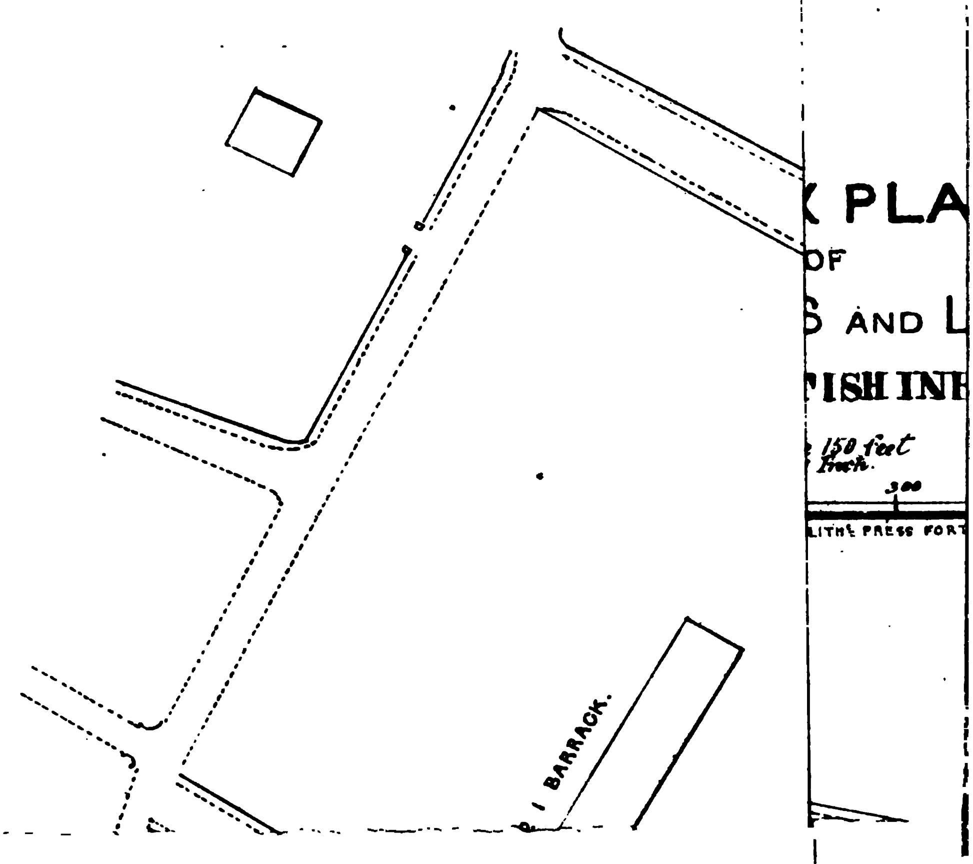

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Her Majesty's British Troops.

Barracks and Lines of Her Majesty's British Infantry.

Site.

52. The ground occupied by the barracks of Her Majesty's British Infantry is on the left of the Cantonment, between the 1st Native Infantry Lines to the right, and the Royal Artillery upon the left. The site upon which the barracks and subsidiary buildings e erected is slightly elevated as relates to the immediate neighbourhood; but w as regards the general levels of the Cantonment, while the ground falls off mediately in rear of the barracks towards a low tract of land, the conditions the surface of which sufficiently indicate, even at the time I write, that at rtain seasons of the year it is swampy; which is in fact the case.

53. There can be little doubt that this locality offers many of the conditions ld to be favorable to the generation of malarious exhalations, and when this atement is read in connection with the section devoted to the "Medical istory" of the station, it becomes a grave question whether, if the barracks e to remain in their present position, it does not become imperative to drain it pon scientific principles; not merely to make efficient provision for ready scape of surface waters lodging here, but also for subsoil waters which during e drying up process, which goes on after the rains, exhale their vapours through e numerous fissures and crevices into which the ground opens.

Drainage.

54. The natural drainage of the immediate surface occupied by the barracks is fair, and leads to the low ground just referred to; the road side drains are kept in good order, and the water ways of the different bridges and culverts are kept clear and unobstructed.

No provision is, however, made for the independent drainage of each barack block. The water falling from their roofs sinks into the ground. The barracks are, however, surrounded on a level with the floors, with a masonry channel designed, I can only presume, to carry off waters used in washing the barrack floors, as they communicate with the verandahs by small openings in the walls, while they are within the line of the eaves of the roof so that roof waters fall beyond them.

Rectangular masonry drains run along the rear of the barracks. The gradients are from the centre to the two extremes, and the drains open into large nullahs or natural water-courses. The main drain receives all the refuse waters from the wash-houses, and cook-rooms, and from the family quarters by small subsidiary drains. The waste waters from the plunge baths are conveyed to the soldiers' garden by masonry conduits.

Barracks.

55. The barracks, (one block of which only was in occupation on the date of my inspection, as Her Majesty's 90th Regiment, relieving the 91st, which recently left for Bombay *en route* to England, had not arrived) consist of ten blocks arranged in column of Companies, which, with their subsidiary buildings are shown upon the block plan facing this page.

Aspect.

56. The 'strike' of these buildings is N. E. and S. W.; their aspect, therefore, is faulty; they are 'end on' or nearly so to the prevailing winds.

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57. The dates of construction of the barracks extend from 1829 to 1844. Blocks 3, 4, 5, 6, 7, and 8, were erected from 1824 to 1830. Blocks 1 and 2 in 1837; 9 in 1841, and 10 in 1844. All have, however, undergone, from time to time, very material alterations and improvements. Since 1860, the high wall surrounding them has been removed, verandahs have been added, and ridge ventilation introduced.

Date of constrpction.

58. The average height of the floors of the barracks is above 2 feet. The configuration of the ground varies much, but slopes generally in a south-easterly direction. In some instances the southern, while in others the northern, ends of the barracks are on a level with the ground.

Elevation of floors.

59. Each barrack consists virtually of one long room, for although there are three compartments, they open into each other by large open archways, as shown in the plan.

General description of buildings.

The entire length of the central room is, by the plan 250½ feet, while by the "Statement of Accomodation" in the Appendix it is entered at 253. The width is 24 feet and the height to wall plate 16′ 9″. Accepting the Executive Engineer's measurements, as the correct ones, the superficial space is 6,012 feet, and the cubical contents 100,701 feet. The area suffices at the regulated allotment of 90 feet for the accommodation of 66 men or for 660 men in the ten ranges.

This does not agree with the allotment given by the Quarter Master General, Madras, in his letter No. $\frac{523}{7308}$, of 27th August, to the address of the Secretary to Government, Military Department, Fort Saint George, in which at the superficial allotment of 90 feet, the accommodation is stated to suffice for 55 men. The difference is 11 men or 110 for the ten blocks. The 'Designation Boards' are marked for 66 men. These discrepancies in allotment affect the question of additional accommodation discussed in the letter above referred to, and which was estimated at 62 men. In point of fact the ten ranges with the accommodation for the married men, suffice for an entire Regiment, as now constituted thus—

Strength of a Regiment in rank and file, as per Quarter Master General's letter above alluded to		806
Quarter's found in ten barracks at 66 men per barrack, (as per Designation Board)	660	
Four ranges of family barracks at 20	80	
Accommodation found at Seetabuldee	50	
Do. do. at Chindwarrah	67	
	——	857
Accommodation at Kamptee *in excess* of that actually required	=	51

60. The centre room is surrounded by an enclosed verandah, communicating with the outer air, by panelled doors and windows, (no glass) and the barrack rooms communicate with the verandahs by open arches. There were originally, as shown upon the plan, 19 of these arches on each side, and the wall spaces between the arches measured 9 feet. To accommodate the number of beds for which the superficies suffices, it was necessary, therefore, to place two beds between each arch, which gave only 4′ 6″ of actual wall space to each bed, and consequently brought them into objectionable

Verandahs enclosed.

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proximity. To give as nearly as possible the number of running feet allowed by the regulations to each bed, it was found necessary to build up some of the arches 5 feet from the ground, increasing the wall spaces to 22′ 6″ in which four beds are arranged at an allotment of 5′ 7″ per bed exclusive of the archways. The two end wall spaces are 36′ 3″, and here six cots are placed.

Ventilation.

61. Each barrack has ridge ventilation, continuous in two ranges but in others in three sections representing the compartments into which the barrack rooms are supposed to be divided. Other ventilation is found only by doors and windows, and as these are batten, when closed, ventilation is interfered with, and the due admission of light prevented. This might be remedied at a moderate outlay. The windows should certainly be glazed so as to admit light, and exclude the hot winds during the hot season. The upper half of the doors might also be glazed with much advantage.

In consideration also of the extremes of temperature experienced at this station, it is advisable that the upper portion of the windows should be glazed upon the double-ventilating pane system, or be furnished with perforated zinc-plates. Ventilating apertures of this description (perforated zinc,) furnished with shutters to regulate the entering current of air might also be introduced into the lower panels of the doors.

Unfortunately the barracks were empty on the date of my inspection, so that I was unable to determine whether the ventilation was sufficient when occupied, and especially at night; but taking into consideration the construction of the barracks, the nature of the doors and windows, and the peculiarity of climate, I think that means should be taken to provide for the admission and regulation of air currents both during the hot and cold season; for, when the doors and windows are closed to exclude either hot or cold air, ventilation must be insufficient.

Verandahs used as Day and Dining rooms.

62. The verandahs are not occupied as dormitories, one however is used as a dining and day room, and in the other water filters are placed. This is an objectionable position for these filters, as the water supply is liable to absorb the foul gases evolved in rooms occupied by large numbers of men, and the verandahs communicate directly with the dormitories by open arches.

Serjeants' Quarters.

63. The north end of each barrack is divided into quarters for Non-Commissioned Officers of which there are two, each comprising three rooms one 16′ × 15′-3″, one 16′ × 9′-3″ and one (a bath-room) 9′ × 10″. These quarters are surrounded by an open verandah; the windows are glazed and the doors half-glazed. Further details of construction are illustrated by the plans and sections.

I have already remarked that the figures upon the 'Designation Boards' suspended in the rooms do not quite agree with those I have just given from the Engineer's plans. They are 5,928 superficial, and 118,560 cubic feet, allotment of men 66. This is only another instance of the discrepancies I have found to exist at other stations, between the measurement made by the Engineer's and Quarter Master General's Departments. In the Engineer's measurements cubic space is calculated upon height to wall plate.

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Means of cooling the air.

64. The barracks are duly furnished with punkahs, and, during the hot season, tatties, with an establishment for watering them are allowed; but the position of these barracks in relation to the prevailing winds deprives them of the full advantage derivable from this means of cooling.

Blocks eight and ten have attic windows at the south end, but they are fixed and are for the admission of light and not of air. They might with advantage be converted upon the swing principle.

Water supply.

65. The water supply is derived from four wells which are said to yield an abundance for all purposes, except those worked to supply the plunge-baths which during the dry season barely meet the demands upon them.

No analysis has been made of the waters. They are rather hard as indicated by their behaviour with soap. It is much to be desired that a standard analysis should be undertaken by some competent person.

Auxiliary accommodation.

66. I have already remarked that one of the enclosed verandah rooms serves as a day and dining room to each barrack.

No Recreation-room.

67. There is no recreation-room.

New Canteen.

68. A new spacious and well ventilated Canteen has recently been built, and will be taken into use on the arrival of the 90th Regiment, the old Canteen being converted into a coffee-shop. The new Canteen is an imposing structure, and affords all the accommodation sanctioned in such buildings.

Guard-room, &c.

Prison-room.

69. The guard-room is in two stories, the ground floor being occupied by the guard and prisoners, and the upper floor as an orderly room and Paymaster's office. The guard-room proper, is in two compartments 47′ 6″ and 34′ × 19′ × 11′ respectively, and affords accommodation at 90 square feet for 17 men. The prison-room is 19′ × 19′ × 11′ and the cells, of which there are 8, have (6) the dimensions of 19′ × 11′ and (2) of 19′ × 8′ giving a superficial area of 209 and 152 square feet respectively, and a cubic measurement of 2,299 and 1,672 feet. They are fairly ventilated and are under a terraced roof. Ventilation could, however, be improved by removing the shutters which close the upper barred windows, and which are not required, as the windows are protected on the outside by weather boards. On my inspection the shutters were either closed or kept insufficiently open The Barrack Master signified his intention to remove them as I suggested. A sketch plan of the new Canteen and of the guard-room faces this page.

Solitary cells.

70. There are also twelve additional cells near the Hospital which are, however, seldom used. They are arranged in three rows of four in each row and are of the following dimensions, 8′ × 8′ × 12′. They are well ventilated both by the floor and beneath the roof by barred openings and are thatched over. The block plan of the Hospitals shows the position and arrangement of these cells. They do not afford the amount of cubic and superficial space now allowed, are too crowded together and have been condemned.

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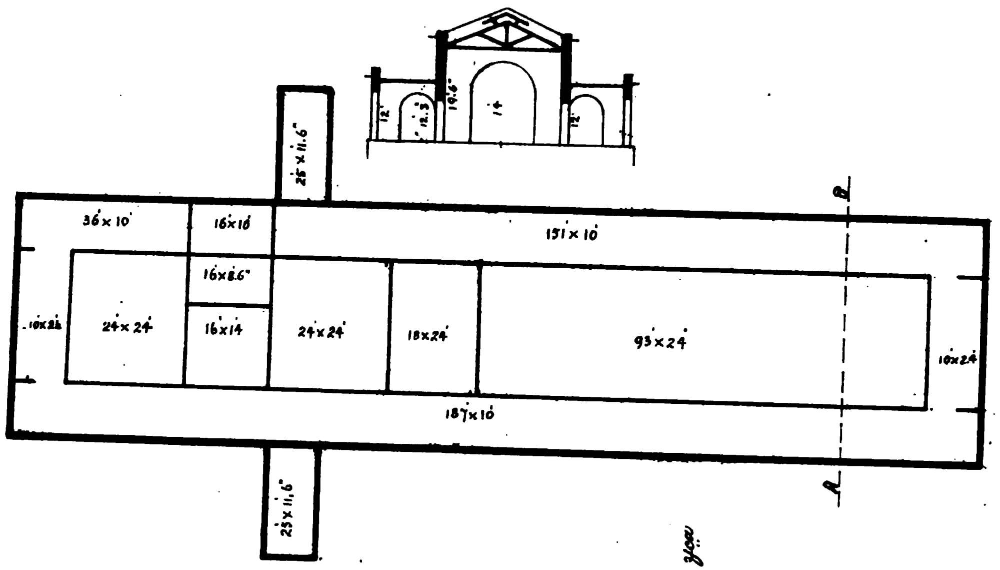
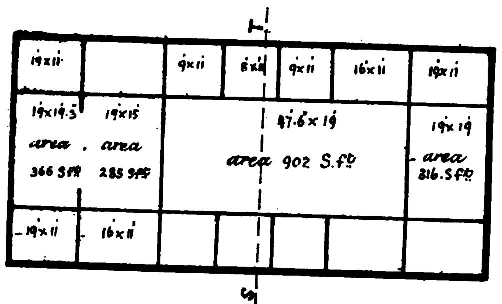
CANTEEN

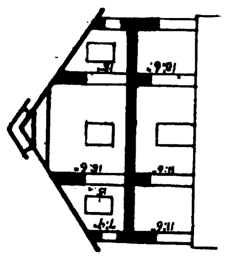
Section on AB.





Orderly Room
Pay Office and Guard Room

Section through Orderly Room &c. on ST



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/True Copy/

Howard B. Montgomery
in/c
Secretary to Sanitary Commissioner

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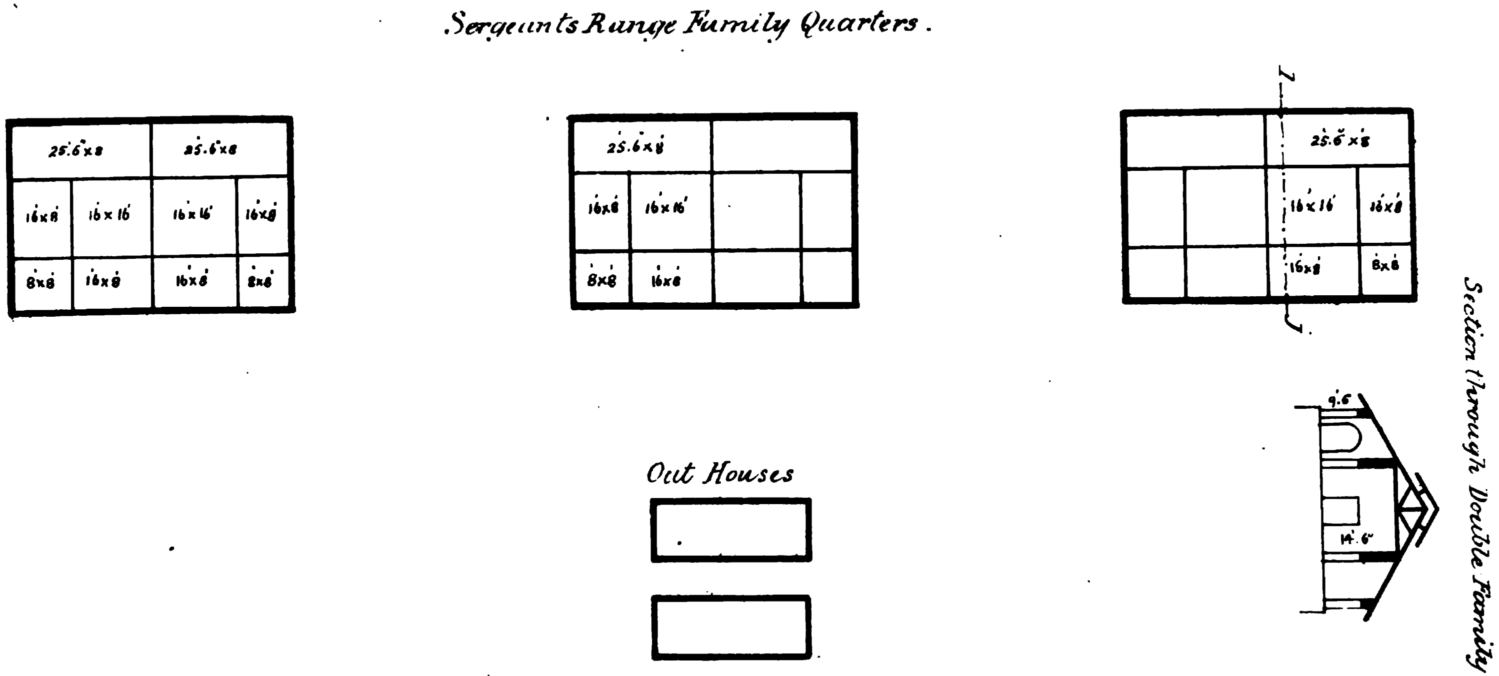
RANGES OF FAMILY QUARTERS
BRITISH INFANTRY,

Showing general arrangement, portion of out Offices, and aspect in relation to prevailing winds.

AT

KAMPTEE



Sergeants Range Family Quarters

LITH.D BY R. J. BALDREY GOV.T LITH.C PRESS FORT ST GEORGE MADRAS MAY 1869.

/True Copy/ Howard Blunt Gomme [?]
Secretary to Sanitary Commissioner

71. A new Fives Court has recently been built. There are two Skittle Alleys; and a small Gymnasium has recently been erected. It is in the open air and can, therefore, only be used in the cold season or during short periods of the day. It should be covered in with a light and lofty roof.

Recreation and amusement.

Fives Court, Skittle Alleys, Gymnasium.

72. Provision is found for black-smiths' carpenters' and shoe-makers' shops, owing, however, to the fact that the Infantry Regiment recently quartered here only occupied the barracks for short periods in anticipation of embarkation for England, but little encouragement could be given to industrial occupations.

Workshops.

73. The accommodation for the married men is very good. It consists of five ranges, four of twenty quarters in each, one of eight, with six blocks, each containing two quarters for the married Serjeants.

Family quarters.

74. The blocks of Serjeants' quarters are arranged back-to-back with the out-houses between. The aspect is east and west. Each block has two quarters containing four rooms of the following dimensions one 16′ × 16′, one 16′ × 9′, one 16′ × 8′ and one (a bath-room) 8′ × 8′. The height of walls of central rooms is 16 feet. The out-houses consist of cook-rooms and latrines, one cook-room and one latrine in two sections for men and women, to each range of three blocks.

Serjeants' quarters.

75. The family quarters, range east and west nearly, and are arranged also back-to-back with the out-houses between the ranges. The aspect of each block is consequently north and south nearly. Each quarter comprises two rooms 18′ × 12′ and 12′ × 12′ respectively. Bath-rooms, in supersession of the detached lavatories, have recently been added to the eighteen central quarters, being projected to the rear, and one to each end quarter at the side.

Privates' quarters.

These bath-rooms are all drained, the centre ones to a stone drain leading along their whole rear, discharging into the nearest main drain. The end rooms are furnished with cisterns for the refuse waters, which are removed daily. The old bath-rooms (now disused) are also furnished with masonry reservoirs for waste waters, which used to be utilized for watering the ground round the quarters.

The windows of these quarters are glazed, and the doors half glazed; there is ridge ventilation throughout the whole length; they are new, having been constructed in 1864-65, and 1866. The cook-houses are convenient buildings, are duly drained, and have stone reservoirs attached as 'dust bins'. The latrines are built upon Dr. Hathaway's plan.

76. These quarters, so far as their construction goes, are every thing that can be desired. Their position, however, has been fixed entirely with reference to available space, certain sanitary considerations being undoubtedly lost sight of, or made to give place to other requirements. The sketch plan that faces this page, (on which the compass points, and direction of prevailing winds are marked) proves this. The Serjeants' quarters have the best aspect, but the back to back arrangement deprives them of much of the advantage derivable from the use of tatties during the hot weather. The Privates' quarters are end on nearly to the prevailing winds, and are even worse circumstanced in respect to the use of tatties.

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77. Much of the subsidiary barrack accommodation is comparatively of recent date. The lavatories of which there are ten, one to each barrack, were constructed, in 1859. The position they occupy as shown upon the block plan, is in rear of the Barracks. They are very convenient and upon one uniform plan. They are furnished with a row of fixed copper basins along one side, supplied by taps and furnished with plugs and waste water pipes.

Subsidiary Barrack accommodation.

Wash-houses.

The basins are supplied from a high level reservoir running along the whole length of the building, and which is filled from the outside. On the opposite side of the building are four small bath rooms, sufficiently screened to ensure privacy, and furnished with a half cask and pegs for clothes. At one end is a urinary, the urinals consisting of coal-tar-painted wooden tubs.

The buildings are well lighted and ventilated by swing (glazed) windows beneath the roof, and the small bathing compartments by open tile work. Gratings are furnished for the men to stand on while at their ablutions, and the rooms are drained by small masonry channels falling into the main drain. They are altogether very convenient, and well arranged buildings, and differ but very slightly from the standard plan in use with the Madras Department of Public Works.

78. Two plunge-baths built in 1863, are found for the Infantry Regiment. They are spacious commodious buildings. I do not think it necessary to describe them in detail. The overflow waters are conveyed by a masonry aqueduct to the soldiers' gardens.

Plunge-baths.

79. The Latrines are of two descriptions, built between 1862, and 1865. Four of them are double (Nos. 1 and 2, and 4 and 5,) and the rest single. The double buildings are spacious, lofty, well lighted, and ventilated by glazed swing windows at the top of the walls and ridge ventilation. Each building contains twenty seats in two sets of ten, divided off so as to constitute a double latrine. They are upon Dr. Hathaway's system, admitting of removal of the tubs from the rear by the "constant watchers" on duty in the passage. When in use by Her Majesty's 91st Regiment, they were worked upon the "dry earth" system, and in each latrine the words "use dry earth" are painted upon the walls. There is, however, no proper earth store in them, a six-dozen case being used for the purpose. I shall also presently show that it is difficult to adopt the dry earth system efficiently in these latrines.

Latrines.

The other latrines are single and of different construction, strictly upon Dr. Hathaway's plan. The roof, which is ridge ventilated, is supported on pillars. The walls do not reach to the roof, and consequently admit of rain driving in during the wet weather, so that it is impossible to work the dry earth system efficiently. They have a cart stand attached and a urinary.

80. To adapt both description of latrines to the dry earth system, it will be necessary to make additions to them of dry earth *expense* stores, and to construct a *general* dry earth store and cart stand. Expense reservoirs for earth could easily be added to each kind of latrine in supersession of the wooden box now used. But the most important consideration in connection with any latrine worked upon the dry earth system is the *immediate* use of dry earth. It has been found that the soldier himself will not

Latrines not adapted to dry earth system.

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use the earth, and that we must trust entirely to the scavenger. Now it is impossible that this menial can, under the present construction of these buildings, apply the earth without entering the building. He cannot do so from the back passage. The rear wall is so thick that the ordure tub stands as it were at the end of a passage into which the attendant must almost crawl to reach the vessel either to remove it or to apply earth. It is in fact quite out of his reach. But if the rear wall consisted only of sheet iron or wood, the roof being supported only by pillars, the case would be different: not only would the privy tubs be within easy reach of the hand, but by a simple arrangement of a 'shoot' just above the seat placed at the proper angle, the attendant could deliver a scoopful of earth, which would fall directly into the privy tub. I recommend this for the consideration of Government, pending the introduction of some cheap and efficient self-acting earth closet. The alteration of the latrines upon this principle would be facile and not costly. In the first described latrines, it would only be necessary to break out the rear wall, leaving portions standing at intervals to be converted into pillars or wide arches to support the roof; between each of which should be placed thin screen partitions of wood or sheet iron, directly up to which the seat would be brought so as to be within easy reach of the sweeper; and if in the thin partition apertures with shoots at the proper angle were made, the dry earth could be efficiently applied.

In the second description of latrines as the roof is only supported on pillars it would only be necessary to substitute sheet iron for the present cutcha wall.

81. Under existing construction and arrangements it is impossible that the dry earth system can be properly carried out; and it is most desirable that it should be, for as I shall note when I write upon the Royal Artillery, it is far superior to the 'dry system' carried out in that Regiment, and under which the latrines were not so free from smell as they ought to be, and as they are capable of being kept under the dry earth system.

I may mention in connection with the latrines generally that I advise a more liberal use of coal tar, and recommend that the seats and all wood-work, as well as the screens separating the seats, be painted with it. At my inspection, although I did not find the seats soiled with excrement, they looked dirty as all wood-work does, unless painted.

Night urinals and urinaries.

82. No night urinals are in use by the Detachment, the men having to resort to the urinaries attached to the latrines.

These urinaries generally are not well kept; not so free from smell as they should be. Wooden tubs are in use and they are not suited to the purpose. I recommend that all urinaries be furnished with iron or glazed earthenware vessels, and that McDougall's Disinfecting Powder be allowed for use in them.

Cook-rooms.

83. The cook-rooms are five in number, four of old structure (built in 1828 to 1845) and one of more recent pattern erected in 1857.

The old ones are narrow, ill-lighted, badly ventilated, smoke-begrimed places, with native fire-places and without flues, so that no European can remain in them. They have no sink, but utensils are washed outside the building upon a flagged pavement. They are drained by a masonry channel leading to the main

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drain. The more recent cook-room is a better description of building, but very indifferent. Each cook-room is furnished with a table and chopping block, but there is no room for the safe or cup-board allowed by regulation.

These cook-rooms, indeed the kitchens generally of the European Force are behind the age. Improved buildings will be needed in connection with any new barracks that may be built, and cooking ranges should be introduced.

84. None of the subsidiary buildings are connected with the barracks by covered ways.

85. I do not think it necessary to allude to the other buildings forming part of the accommodation of the Regiment referred to in the statement of accommodation return.

Gardens.

86. A plot of ground is enclosed in close proximity to the barracks and it is well supplied with water. It was not cultivated by the Regiment last in occupation which being under orders for England at the termination of one year's residence had no inducement to keep it up.

Recapitulation.

87. Such is a brief description of these barracks with their auxiliary and subsidiary accommodation.

The barracks themselves are located in objectionable proximity to low undrained swampy ground, are obsolete in structure, are too crowded together, indifferently ventilated, badly lighted, and are not from their position in relation to the prevailing winds capable of perflation. The out-houses, moreover, have been placed to windward of them.

The family quarters are in themselves everything that can be desired, but the different blocks have been arranged simply in relation to available space, and consequently are not only too crowded together, but do not derive advantage from prevailing winds. The back-to-back arrangement of the ranges, with the out-houses between them, is decidedly objectionable.

The plunge-baths, bath-rooms, and latrines, are all comparatively new buildings.

In fact a large outlay has been incurred in providing auxiliary and subsidiary accommodation for barracks which are in themselves most faulty and which the most competent authorities have pronounced must sooner or later give place to new barracks upon the standard plan;* an alternative the Government of India have accepted, rejecting certain propositions that have been made for their improvement and enlargement, or for transfer of the force to another locality, as to Chindwarrah, as proposed by Mr. Campbell, or to the neighbourhood of Nagpore, as referred to upon Military grounds by His Excellency Sir W. Mansfield, in his Memorandum of 12th December 1867.

Question of site for new barracks.

88. Assuming then that it has been definitely determined that Kamptee is to be retained as a Cantonment for British Troops, Chindwarrah being utilized only as a Sanitarium or Convalescent Depôt, the question is—where are the new Infantry barrracks to be located?

* The following is His Excellency Sir W. Mansfield's opinion as expressed in his Memorandum of the 12th December 1867.

"The Infantry Barracks, although not displaying all the faults of the Artillery, are nevertheless of a very inferior order. They run in ten parallel lines, the distance between two barracks being 50 yards, and strange to say even the end barrack is not so placed as fairly to front the prevailing wind. In short the arrangement of the buildings is the worst possible, there being the additional evil of the out-offices lying to windward of the living rooms.

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It will be at once seen by a reference to the Block plan of the existing barracks, that the ground is too cramped for the erection of nine blocks (the number suggested by Sir W. Mansfield, as under his scheme one Company will be stationed at Nagpore) with their auxiliary and subsidiary buildings upon the standard plan.

The front required by the standard plan is 3,020 feet, and the depth 1,740. The frontage now occupied by the barracks is 2,700 feet, (nearly) and the available depth is 1,350, but this would bring buildings quite upon the low and swampy ground in rear of the present barracks, upon which the new Canteen and Ball Courts have recently been built.

To crowd new buildings upon the present site, retaining the objectionable position of the subsidiary buildings, and giving due consideration to the existence of low swampy ground, in close proximity to them, would, in my judgment, be a fatal error; and after a careful perusal of all that has been written upon the subject, I can see no alternative, but the laying out of a new Cantonment on the high ground known as 'Blogg's Ride,' which offers ample space for the whole European Force.

89. I do not under-estimate the immense sacrifice the Government would have to make in the abandonment of the old barracks, and the recently erected auxiliary and subsidiary buildings; but such abandonment appears to me unavoidable. His Excellency Sir W. Mansfield, however, does not lay much stress upon the financial bearings of the question, as regards public buildings; but views with disfavour giving up the present Cantonment, on account of the injury likely to be done to the interests of owners of private property, and to the prosperity of the large native town.

The removal of the British Troops to the high ground would certainly entail the necessity of laying out some miles of road, and of providing officers' quarters; but this is not more than has been done at the new Cantonment of Trimulgherry, near Secunderabad. It is not, however, within my province to dwell upon the financial aspects of the question. Upon sanitary grounds I advocate the selection of a *new* site upon the highest ground to be found in the neighbourhood, namely, 'Blogg's Ride,' a site which will be to windward of the low and swampy ground that separates it from that part of the Cantonment occupied by British Troops.

[Since this was written I have received instructions to submit a special report upon the site assigned for the erection of the new Artillery barracks. My report will be found in the Appendix.]

Barracks and Lines of the Royal Artillery.

90. The barrack accommodation for the Royal Artillery is supposed to, and at present is made to, suffice for one Battery of Horse Artillery, and two Light Field Batteries. At the time of my commencing my inspection of the station an additional Battery of Horse Artillery (under orders for Secunderabad, but detained pending instructions consequent upon the appearance of Cholera at the latter station) occupied the 'Reserve Barracks.' Eventually the Artillery is to be reduced to one Horse, and one Light Field Battery, a Garrison Battery being located at Seetabuldee.

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Horse Artillery Barracks.

91. The barracks of the Royal Horse Artillery consist of two ranges of 'Half Battery Barracks' very similar in construction to those assigned to the Infantry. Each block consists of one long room surrounded by an enclosed verandah with an outer open verandah on the west.

General description.

92. The buildings range in an E.N.E. and W.S.W. direction and are consequently nearly end on to the prevailing winds. Each building at the south end affords accommodation for the Non-Commissioned Officers, and No. 2 block has in addition a portion screened off as a coffee-room. The space available for dormitories is in block No. 1, 200′ 6″ × 21′ 6″ × 17′ 3,″ and the superficial measurement is 4,310 feet equal to the accommodation of forty-eight beds. These figures do not agree with those entered in the statement of accommodation.

Aspect and accommodation.

In the other barrack 178′ 6″ are assigned to the single men, which × 21′ 6″ suffice at 90 superficial feet for forty-two men. The total accommodation is equal, therefore, to ninety men. It will be seen by the statement of accommodation that 106 beds are accommodated in the two rooms, or 16 in excess of the allotment. The total area of each barrack including the Non-Commissioned Officers' rooms is upon the Engineer's plan sufficient for fifty-three men. The family quarters offer accommodation for twenty men besides the Staff Serjeants.

The barrack rooms communicate with the enclosed verandahs by open arches, and the verandahs have batten doors and windows. The end doors and windows are, however, glazed.

The wall space between each archway is 4′ 7″ and suffices consequently for only one cot; but in some two were placed bringing them into most objectionable proximity—indeed they were almost touching. But as each barrack is supposed to accommodate fifty-two men, and as there are only 37 spaces between the arches, it is necessary to double some of the beds to obtain the necessary accommodation.

In the Infantry barracks as already stated, alternate arches have been built up a few feet from the ground, so as to obtain more wall space. This plan might be adopted with advantage in these barracks.

93. Each barrack is ventilated by the ridge in three sections, but there are no special openings for the admission of air when the doors and windows are closed. No ventilation in fact independent of them.

Ventilation.

94. The floor elevation is about 2 feet on an average; but owing to the configuration of the ground it varies from 3′ 11″ to 0′ 10.″

Elevation.

95. The position of the barracks is to the westward of those of the British Infantry upon ground slightly more elevated, and not so near to the swampy ground upon which the latter encroach.

Site.

96. A masonry drain runs round the barracks which receives tributary drains of the same description from the bath-rooms and cook-rooms. The barrack buildings themselves are not drained; rain water falls from the roof upon the ground. The masonry drains are not thoroughly efficient. Their gradients are faulty in parts and refuse waters lodge.

Drainage.

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97. The spaces between the two ends of the barrack blocks are occupied, to the south-west by the Staff Serjeants' quarters, and to the north-east by the ablution room, cook-room, and latrine, so that the general arrangement is quadrangular with open ends.

jeants' quarters rly rooms.

lation is not, however, materially,—though it is certainly to some extent—ered with by the arrangement of the buildings just noted.

98. The Staff Serjeants' quarters are convenient and comfortable. Each comprises four rooms with attached bath-room, cook-room, and latrine. The rooms are respectively 18′ × 12′, 14′ × 12′, wo verandah rooms 18′ × 8′.

jeants' quarters.

99. The Orderly room divides the two sets of quarters. The entire building is of recent erection. The centre is under a tiled and ridge ventilated roof, and the front terraced.

y room.

100. The out-houses attached to the barracks are of recent erection and upon the plan already described in connection with the barracks of the British Infantry. The cook-room is spacious with a terraced roof, but low. The fire places are arranged under a flue, but sufficient provision is not made for the escape of smoke. The Battery is also duly furnished with other accessory buildings noted in the margin.

k cook-rooms, use, and la- -room, Harness- gram godown, les, gun sheds.

101. The family quarters are identical in construction with those described in connection with the barracks of British Infantry.

y quarters.

They consist of two distinct ranges of quarters. Six blocks, of two quarters h block, are situated to the S. W. of the barracks and close to them and, the Infantry are arranged in two lines with the out-houses between them. other range of eight quarters is at a greater distance from the barracks, the Horse lines, and to westward of the Soldiers' gardens.

The out-houses of all these quarters are upon the same plan. The latrines upon Dr. Hathaway's system, and were fairly kept, but dry earth was n use.

All wash-houses are drained into the main drain.

102. The Guard-room is remote from the barracks, being situated beyond the Horse lines. It is a new building, and comprises besides the guard-room, four prison-rooms of the following dimensions:—rd-room 27′ × 16′ × 14′ 9″, two prison-rooms each 15′ × 16′, and two ary cells 15′ × 8′ 6″. The building is under a pent tiled roof with ridge tilation. The prison-rooms are fairly ventilated.

rd-room.

The other buildings, forming part of the auxiliary accommodation of the tery, need not be described in detail. Suffice it to say that the harness room spacious building well suited to the purpose.

103. The Horse lines are to the westward of the barracks extending towards low ground, part of which is swampy as shown in the 'block plan.' The lines are well kept. Refuse stable litter is oved to a walled enclosure, where it is kept till removed by the purchasers.

rse lines.

104. The gardens are but little appreciated—indeed the Artillery-man's time is too much taken up in his numerous duties to admit of his devoting much of it to horticultural pursuits.

ldiers' gardens.

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Barracks of the Field Batteries of Artillery.

105. The barracks of the two Batteries of Field Artillery are located to the westward of those of the Horse Artillery. They are of a very inferior and obsolete description and arranged upon a plan utterly opposed to all sanitary principles. There are two blocks, and each consists of two long rooms ranged side by side, opening into each other by arch-ways, and communicating also by arch-ways with enclosed verandahs. By this arrangement each barrack may be considered to consist of one spacious room holding four rows of beds. The buildings are ridge ventilated in three sections, and have batten doors and windows to the verandahs. The verandahs are terraced. The superficial measurement of the two central rooms is 7,200 feet, and the cubic 120,600. This accommodation at 90 superficial feet suffices for eighty men only, or forty to each room. To find accommodation, therefore, it has been necessary to place beds in one of the verandahs, while in the other, room is found for a library, coffee-shop and tailors' shop.

Site and position.

106. As these buildings have been condemned, and plans have been submitted for new accommodation for the whole of the Artillery, it would be waste of time to go into a further detailed account of them. The plan facing this page will afford a better illustration of their faultiness than any amount of "word-painting."

Barracks condemned.

107. Within quite recent periods auxiliary and subsidiary accommodation for these barracks has been provided, of the same description as that already referred to in the case of the Infantry.

108. The cook-rooms are double, arranged back-to-back. The fire places are not built beneath flues. The buildings are dark and smoky, and the soldier-cook cannot long remain in them.

Cook-rooms.

109. The family quarters are in two ranges and are on the same plan as those I have already described. I need only refer to the location of one of the ranges, so close to the Horse lines, that the inmates at all times breathe a stable atmosphere. Their faulty position was severely commented on by His Excellency Sir W. Mansfield at his late inspection of this station.

Family quarters.

110. The guard-room is common to the two Batteries, and affords sufficient accommodation.

Guard-room.

111. The dry-room and prison-room is new. The rooms are furnished with raised bed places. The solitary cells are all well ventilated. They have open iron barred doors with floor and wall ventilators.

Prison-room and Cells.

112. In a latrine attached to this institution, the 'separating' system has been introduced. The urine is received in a metal (zinc) gutter or trough running along the front of the seats, and conveyed to a bucket outside, while the solid excreta only fall into the privy tub. This arrangement is said to work well. The latrine was not kept upon the dry earth system, and the urine in the bucket was decomposed. I suggested that the zinc trough should be painted with coal tar, and McDougall's Disinfecting Powder used in the vessel made to receive the urine.

Attached latrine.

113. These Batteries have detached harness-rooms in convenient proximity to their Horse lines, which are situated on the extreme left or to the westward.

Harness-rooms.

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114. The Horse lines are well kept; are upon a raised locality and well drained. Their conservancy is well attended to in every point.

Horse lines.

115. The accommodation connected with the occupation and recreation of the men of the Artillery is common to all the Batteries and comprises a Canteen, Coffee-shop, Fives Court, Skittle Alley, and a small Gymnasium recently erected. Like that of the Infantry, the latter is in the open air. The gardens are only very partially cultivated. No recreation room has yet been provided.

Canteen, Coffee-shop, Fives Court, Skittle Alley, Gymnasium.

Gardens.

No recreation room.

116. A detached Military Prison, common to the whole of the Artillery, has recently been built. It is situated near the Hospitals presently to be described. It is most commodious and contains a dry-room 41′ × 17′ × 25′ four cells 21′ × 17′ × 25′, and four 17′ × 11′ × 12′. The cells open into enclosed and secure, but airy verandah rooms in which the prisoners work during the day. The arrangements for ablution are good, and the cells have small 'night-closets' attached.

Military Prison.

117. Such is a brief description of the barracks of the Royal Artillery and their accessory buildings.

Recapitulation.

The faults of construction, and of arrangement of the blocks in relation to the prevailing winds are admitted by the highest authority. Plans of new barracks upon the standard plan, and of their position in relation to existing buildings have been submitted for the consideration and approval of the Government of India. Having received instructions from the Government of Madras to report upon the site selected for the new barracks, I do not enter into the question here, but refer to my Report which will be found in the Appendix, in which it is discussed not solely in relation to the fresh location of the Artillery, but with reference also to the disposition of the British Infantry, the existing accommodation for which is destined sooner or later to give place to new buildings.

It is too late now to regret the expense that has been incurred in providing new auxiliary and subsidiary accommodation to barracks, in themselves so obsolete in structure, and so faulty in position as to necessitate their entire re-construction.

Hospitals of Her Majesty's British Troops.

118. The hospitals assigned to the sick of Her Majesty's British Troops are located upon the bank of the Kanhan river shortly after its confluence with the Koolar. The river here takes a bend in its course, and there is, in consequence, an eddy when it is a flood, that leads to the deposit of a thick bed of silt, which commencing just below the hospital extends to the Vaikaira ford or ghaut. The river banks are also not so high, as in other parts of the Cantonment. The position occupied by the sand bank referred to, is shown upon the map of the station. The area occupied by the hospitals, lies to northward of the European Artillery and Infantry lines, and to leeward of the Commissariat Cattle lines and of the large Native town that has grown up around them. The European bazaar is also in close proximity on the south-east. The ground is somewhat intersected by deep nullahs.

Site.

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119. The site then is faulty on sanitary grounds, as being (1) to leeward (during the south-west monsoon) of the cattle lines; (2) too close to the river, (consequently) (3) subjected to miasmatic emanations from the extensive beds of silt exposed on the subsidence of the river after the rains, at which period fevers are so rife at the station.

Drainage.

120. The surface is favorable to drainage, so far that it slopes in directions favorable to the escape of rain-fall; but the *soil* itself (black cotton soil) is very absorbent and retentive of moisture.

Hospitals.

121. The hospitals comprise, the Royal Artillery and British Infantry Hospitals, with their associated female hospitals, the general arrangement of which is shown upon the block plan facing this page,

Obsolete in structure and arrangement.

Have been improved in every possible way.

122. The Infantry hospital is nearest to the river and distant 100 yards from it. The Artillery Hospital is more remote. The buildings are old and obsolete both in structure and arrangement. Much however, has been done of late years to remedy their defects. Additions have been made to provide further accommodation. Ventilation has been improved by removing surrounding walls, and by special openings for the admission and renewal of the air, new latrines and wash-houses have heen constructed, and their conservancy generally improved, But in meeting the necessity for extension of the accommodation, crowding together of the buildings has been unavoidable. This is exemplified, in the instance of the Infantry hospital, in the addition of the two rooms assigned to detained men and Ophthalmic cases.

New Hospitals considered necessary.

123. The hospitals are, however, in my estimation notwithstanding these improvements far worse as hospitals, than the barracks are as barracks, and are incapable of being altered or remodelled to bring them up to the requirements of the day. It has been decided that the barrack accommodation is to be entirely renewed upon the standard plan. I earnestly advocate that new hospital accommodation, also upon the standard plan, be provided and upon another site. I have elsewhere advocated the entire removal of the European Force to "Blogg's Drive;" but if the barracks be not built upon that elevated site the hospitals at any rate should be there located.

Royal Artillery Hospital.

General description of buildings.

124. The hospital of the Artillery is common to the whole of this "arm," and comprises two buildings for the accommodation of the men, and one for the women.

The men's hospital comprises two distinct buildings one of old, the other of more recent structure.

They are arranged in line and communicate by a covered and partly enclosed passage.

Aspect.

125. Their aspect is S. W. and N. E. The prevailing winds of the westerly monsoon are a point or two *north* of west—during the hot weather the prevailing wind is about W. S. W. The Hospitals are not, therefore, well placed in relation to the prevailing winds.

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ahs enclosed.

ter verandah to protect the m direct sun

ꞁ26. Each hospital is surrounded by enclosed verandahs, the southern walls of which are exposed to the full power of the sun, and as the wet tatties used during the hot weather have to be suspended at the doors on this face, the greatest difficulty is experienced in keeping them wet, as evaporation under the influence of direct sunshine upon them is so rapid. An outer verandah along ce is very necessary to protect the walls and the tatties from the direct rays sun.

Wing Hospital.

27. The Right Wing hospital is the most westerly building and contains five rooms, two of which are used as wards for the sick, and three as Surgery, and store-rooms. A portion of the verandah S. W. corner is also used as an Ophthalmic ward, the walls being colored uitable grey.

28. The dimensions of the wards and the superficial and cubic measure- are as follows:—

	Length.		Breadth.		Height to wall plate.	Superficies.	Cubic space.
Ward No. 1...	...60	×	22	×	25	1,320	33,000
Do. „ 2...	...60	×	22	×	25	1,320	33,000

But as these two wards communicate by a wide open archway they really tute one long ward having a superficial measurement of 2,640, and a cubic ity of 66,000 feet. They are, altogether, well proportioned wards. They unicate by open archways with an enclosed verandah going all round the ng from which, to the rear, leads off a covered passage to the ablution room, t the north-western corner, a similar passage leads to the latrine. The n end of the verandah is divided off into small rooms used as Surgery and rooms.

The doors and windows are, as shown upon the plan, panelled. There are d fan-lights at either gable end.

tion.

129. Ventilation is effected by continuous ridge ventilation, and fan-lights in the gable ends.

modation.

130. The accommodation afforded in this hospital at 120 superficial feet per bed is equal to 22 men, and the wall spaces (15 feet) allow 7·5 running feet to each bed. Four of the 22 beds of necessity occupy corner spaces.

wing hospital.

131. The left wing hospital is very similar in construction. It comprises one long ward 109′6″ long by 18′ wide with a height to wall plate, of 20 feet—according to the detailed statement of accommodation furnished to me by the Officer Commanding the tillery—but 15′10″ by the plan, another illustration of the discrepancies so nstantly found between the measurements by the Quarter Master General's and gineer's Departments. At the west end of the building are five rooms, four of ich are verandah rooms; the fifth is used as a "detained" ward, and commucates by open arches with two verandah rooms.

The 'detained' ward is separated from the general ward by a door. This ospital has also enclosed verandahs, with panelled doors and windows. It has ntinuous ridge ventilation.

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132. The large ward has an area of 1,971 feet, and at the standard allotment of space accommodates 16 patients. The detained ward has an area of 274 feet, and each verandah room of 132. The whole accommodation of the two buildings is as shown in the margin. In the Engineer's plan, the accommodation is laid down at 43, the superficial area being 5,226 feet, but in this calculation the two verandah rooms of the left wing building are omitted.

Accommodation.

Right wing	1 ward	area...	2,640
"	1 ward (detained)	do.	341
"	1 do.	do.	1,971
"	1 do. (detained)	do.	274
"	2 do.	at 132 of..............	264
		Total...	5,490

Area 5,490 ÷ 120 = 45·75 say (46·)

133. At the time of my inspection the sick of three Batteries were accommodated, one ward of the right wing building being assigned to the C-D Royal Horse Artillery, and the other to F-20th Brigade; the left wing building was occupied by the sick of the C-14 Brigade. It is decided that the strength of the Artillery at the station shall in future be one Horse and one Field Battery, a Garrison Battery being located at Seetabuldee.

134. The 'hospital' was not fully occupied on the date of my inspection, but the accommodation is often insufficient for the sick of the three Batteries, which, by the resolution of the Government of India should have 50 beds assigned to them.

Ablution-rooms.

135. The ablution accommodation is attached to the right wing hospital. The room contains a row of fixed basins with taps and waste water pipes on one side, the basins being fed from the outside by a high level cistern. On the opposite side is a long reservoir for water divided into compartments. The building is lighted and ventilated by five swing windows and by the ridge. It is not so good a building as those associated with the barracks inasmuch as that it has no attached urinary and no small rooms in which a soldier can get a body-bath in privacy.

Latrines.

136. Each hospital has its latrine arranged upon Dr. Hathaway's plan for the "dry system." There is no reservoir for dry earth. The earth system was, however, in use, and the buildings were fairly free from smell. I have already alluded to the difficulty, if not the impossibility, of carrying out the dry earth system in latrines thus constructed. The rear walls are so thick, that the privy tub stands at the end of a passage, and it is quite impossible for the sweeper to see when a tub is in use and next to impossible for him to remove the tub. These walls should be replaced by pillars and sheet iron or wooden screens, so as to bring the tubs within easy sight and reach of the attendants, or what is better some self-acting apparatus should be introduced rendering the application of the earth independent both of the men themselves and of the Sweepers. I observe by the "Lancet," that self-acting closets of a serviceable description have been put up in the latrines at Dover at the small cost of 4*s.* 6*d.* each. If this self-acting apparatus be really efficient, and if it meets the requirements of India, it is very desirable that the Government should be put in possession of plans and working models.

Conservancy and general economy.

137. The general conservancy of the hospital was every thing that could be desired. The wards were scrupulously clean; as also the beds, bedding, and hospital furniture. The latrines would be better for a more free use of coal tar. I would recommend that all wood-work be painted

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with it. No time should be lost in supplying an earth-store to each latrine. A general earth-store and cart stand has been found, and is located behind the ablution room, but is not shown upon the plan of the buildings, though its site is indicated upon the block plan as "cart stand."

Out Houses. Cook-room. Dead house. Sergeants' Quarters. Guard-room.

138. The out-houses, with the exception of the guard-room, are situated to the rear of the hospitals in the positions indicated on the block plan. The "cook-house" is a fairly comfortable and convenient building. The dead-house is suited to its purpose. The hospital Serjeant has quarters immediately in rear of the hospital, and the Apothecary at a convenient distance from it. The guard-room is in the front of the centre of the hospital.

Water supply.

139. Two wells are shown upon the plan, but one of these is bricked up, and the other is not in use. Water for drinking, or culinary purposes, is brought from a well in the Engineer's yard.

Drainage.

140. Drainage, except from the ablution room from which a masonry drain leads to the river, is entirely natural; but the site upon which the hospitals stand is favorable to a rapid escape of storm-water.

Female Hospital.

141. The female hospital is to the east-ward of the left wing hospital, in a small compound surrounded by a high wall. It has one general ward 37'×18'×21' and a small verandah room, used as a lying-in-ward. It is quite a make-shift hospital when judged by the standard female hospital of the day. The surrounding wall interferes with ventilation. It is too near to the men's ward.

A new hospital, common to the sick of the women and children of the whole force, is a great desideratum.

Hospital, Her Majesty's British Infantry.

Site.

142. The Hospital of Her Majesty's British Infantry is situated close upon the bank of the river behind the Artillery Hospitals. The distance of the rear wall from the river's bank, is by the block plan 280 feet. It is 680 feet from the Artillery Hospital. The whole of the buildings comprising the Hospital, with the exception of the guard-room, are within a walled enclosure; formerly this wall was lofty; but as it interfered with ventilation it was reduced to its present height which is about 2 feet.

Aspect.

143. The "strike" of the building is north and south nearly. The prevailing winds of the hot weather, and westerly monsoon impinge, therefore, fairly upon its side; but free perflation is impeded by the wards which have been added to the building on either side at the centre.

Description of building.

144. The hospital may be described as consisting of a main building and two wings.

The main building is virtually one ward about 245′ long by 23′ 9″ wide, surrounded by enclosed verandahs 9′ 10″ wide, the latter divided off at the ends into small rooms used for administrative purposes.

Ostensibly, however, this long ward is divided into three compartments, ...9″, 88′ 9″ and 78′ 3″ respectively in length, and they are capable of separa-

tion by closed doors; but inasmuch as that the space above the doors is left open and a portion of the walls between the doors has been broken down (see transverse sections upon the plan) to effect a communication between them, there is free interchange of the atmosphere of one room with another.

The wards open into the enclosed verandah by archways and the wall spaces between the arches are 8 feet.

Doors and windows.

145. The doors of the verandah are panelled, and the windows glazed.

Ophthalmic and observation wards.

146. At the centre of the main building two wings have been added to provide wards for men detained under observation and for ophthalmic cases. The ophthalmic ward has direct communication with the central ward; but the detained ward has not, but has a separate entrance and a separate latrine.

Latrine and ablution rooms.

147. The general latrine and ablution room are situated at the end of the main building, communicating with the verandah by covered and well ventilated passages.

Cook-house.

148. The cook-room is also at this end, while the area within the walls is further occupied by the Serjeant's quarters and the recreation or smoking shed. A glance at the plan suffices to show the incongruous grouping of the several component parts of the hospital, and the extent to which ventilation must be interfered with.

Ventilation.

149. Ventilation is affected by interrupted roof or ridge ventilation, both to the main building and the wings. This is shown in the elevation and section on C. D. given on the plan facing this page. The gable ends of the main building have glazed fan lights. The main building has a wooden ceiling in which a long central opening has been left for escape of foul air by the ridge.

Drainage.

150. The natural surface drainage of the hospital is good. The building is further surrounded with a narrow masonry channel leading into reservoirs at the south end, and at the north to a drain which communicating with the wash-house drain, discharges itself into the river.

Accommodation.

151. The accommodation of the hospital comprises three wards in the main building and one in either wing. The dimensions (by the Engineer's plan) are as follows:—

Ward No. 1—	77′9″ × 23′9″ =	area	1,846 feet.
„ „ 2—	88′9″ × 23′9″ =	„	2,108 „
„ „ 3—	78′3″ × 23′9″ =	„	1,858 „
„ „ 4—	48′6″ × 20′ =	„	970 „
„ „ 5—	48′6″ × 20′ =	„	970 „
		Total	7,752 feet.

The total cubic capacity is 107,560 feet, and the accommodation at 120 superficial feet per man, is equal to 64 men. This is in the ratio only of 8 per cent. upon the full strength of a Regiment of Infantry, or 4 per cent. less than the standard allotment at unhealthy stations. In actual number of beds the deficiency is 46.

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152. The accommodation then is quite insufficient, necessitating great overcrowding of the wards, and resort to the verandahs at certain periods of the year when fever prevails so extensively at this station.

Present hospital incapable of further extension.

153. It is quite manifest that no additions can be made to the present hospital. The necessity for the provision of a new one built upon the standard plan, must, I think, be admitted, and I know of no station occupied by the Madras troops in which the necessity for placing the sick, and indeed the healthy, in upper stories as a means of escape from malarious fever, is so urgent.

Auxiliary buildings, guard-room, Serjeants' quarters.

154. The *guard-room* is just out side the boundary wall of the hospital, a ground plan and elevation is given on the general plan. The building consists of a central portion under a tiled and ridge ventilated roof, and a surrounding terraced verandah. It contains three rooms 27′× 23′ × 18′, 91′× 23′ × 18′ and 16′ × 11′ × 34′ respectively.

The accommodation is sufficient, and the ventilation fair.

155. The *Serjeants' quarters* are very indifferent, and comprise one room 16′ × 16′ × 15′; one bath-room 6′ 6″ × 8′6″ × 12′; one store-room 9′6″ × 6′6″ × 12′, and enclosed verandah 42′6″ × 6′6″ × 12′. There is no roof ventilation. The building is very hot, and far inferior in accommodation to the standard plan of building.

Hospital bath-room.

156. The ablution room is a convenient building on the plan of the wash-house before described in connection with the hospital of the Royal Artillery. It has a row of basins on one side, and on the opposite three rectangular reclining or body-baths. Water is supplied from a high level reservoir filled by hand. The building is well lighted by swing windows beneath the eaves. It has no attached urinal.

Latrine.

157. The latrine, as shown upon the plan, has 18 seats. Conservancy is, from the rear, upon Dr. Hathaway's principle. The building is well ventilated by the ridge and by open tile work. It has no permanent provision for dry earth, and like the latrines attached to all the barracks is incapable, owing to the thickness of the back wall, of being efficiently worked upon the dry earth system.

Cook house.

158. The kitchen is the usual style of building with a range of Native fire places on one side, and a verandah in front, and ridge opening for the escape of smoke.

Dead-house.

159. The dead-house is a new and convenient building well lighted and ventilated. It is a terraced building.

The elevations and sections of all these buildings which are given on the plan, afford more information than any amount of descriptive letter press.

Female hospital.

160. The hospital for women and children is detached from the men's hospital at a distance of about 500 feet. It was formerly a men's hospital for a Battery of Artillery, but was made over as a female hospital for the Infantry Regiment on the enlargement of the Artillery (men's) hospital. The hospital, with its accessory buildings s enclosed within a high wall.

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161. The hospital proper comprises two rooms and four verandah rooms with front and rear enclosed verandahs. The main ward is 60′ × 18′ × 15′ (to wall plate). The second ward is 15′ × 18′ and the verandah rooms are 12′ × 10′. The building was unoccupied on the date of my inspection (as was also the men's hospital with the exception of one ward) owing to Her Majesty's 91st Regiment, having just previously quitted the station, and one Company only of the relieving Regiment, the 90th having arrived.

Accommodation.

162. Accepting two rooms, as alone capable of being used as wards for the sick, the total superficial area available for beds is 1,350 feet, which, at 120 feet per bed, suffices for eleven beds. Two of the verandah rooms might be used on emergency raising the accommodation to 14.

Ventilation.

163. The building, as shown by the plan has central ridge and attic ventilation. The doors are wooden, and the windows glazed. The wards communicate with the enclosed verandahs by open arches. The latrine is reached by a covered passage, leading from the end of the men's ward.

The subsidiary buildings are, a nurse's quarter, cook-room, dead-house, and old guard-room, used as a lumber room.

Nurse's quarters.

164. The nurse's quarters are indifferent, and consist of one central and two small verandah rooms.

The cook-room and latrines are convenient, and need no detailed description.

There is no detached ablution room, one of the small verandah rooms is used for that purpose.

The plan, with sections and elevations, will afford any further information required.

Recapitulation.

165. The general design, and arrangement of all the hospitals are obsolete; and although no definite orders have been issued in regard to the construction of new ones, I gather from various sources that the provision is merely a question of time, and that the requirements in this department will be met in connection with new Barrack accommodation for the whole British Force.

166. The hospitals in fact are worse as hospitals than the Barracks are as Barracks. They possess no detached contagious diseases ward, while the means of segregation of different classes of sick are very defective. The site so immediately upon the bank of the river close to a ford and ferry, to leeward of the cattle lines, and in objectionable proximity to the European bazaar, is faulty. No reconstruction or remodelling of the existing buildings will, in my judgment, meet the necessities of the case. They must be entirely rebuilt, and their position is involved in the question I have elsewhere raised of the desirability of removing the whole European Force to "Blogg's Drive."

Improvements necessary to existing hospitals.

167. But as it will be years before new hospitals can be built, I have to advise that the following improvements be made in existing buildings.

i. That a light open verandah be erected along the face of the Royal Artillery hospitals to screen the walls from the direct action of the sun.

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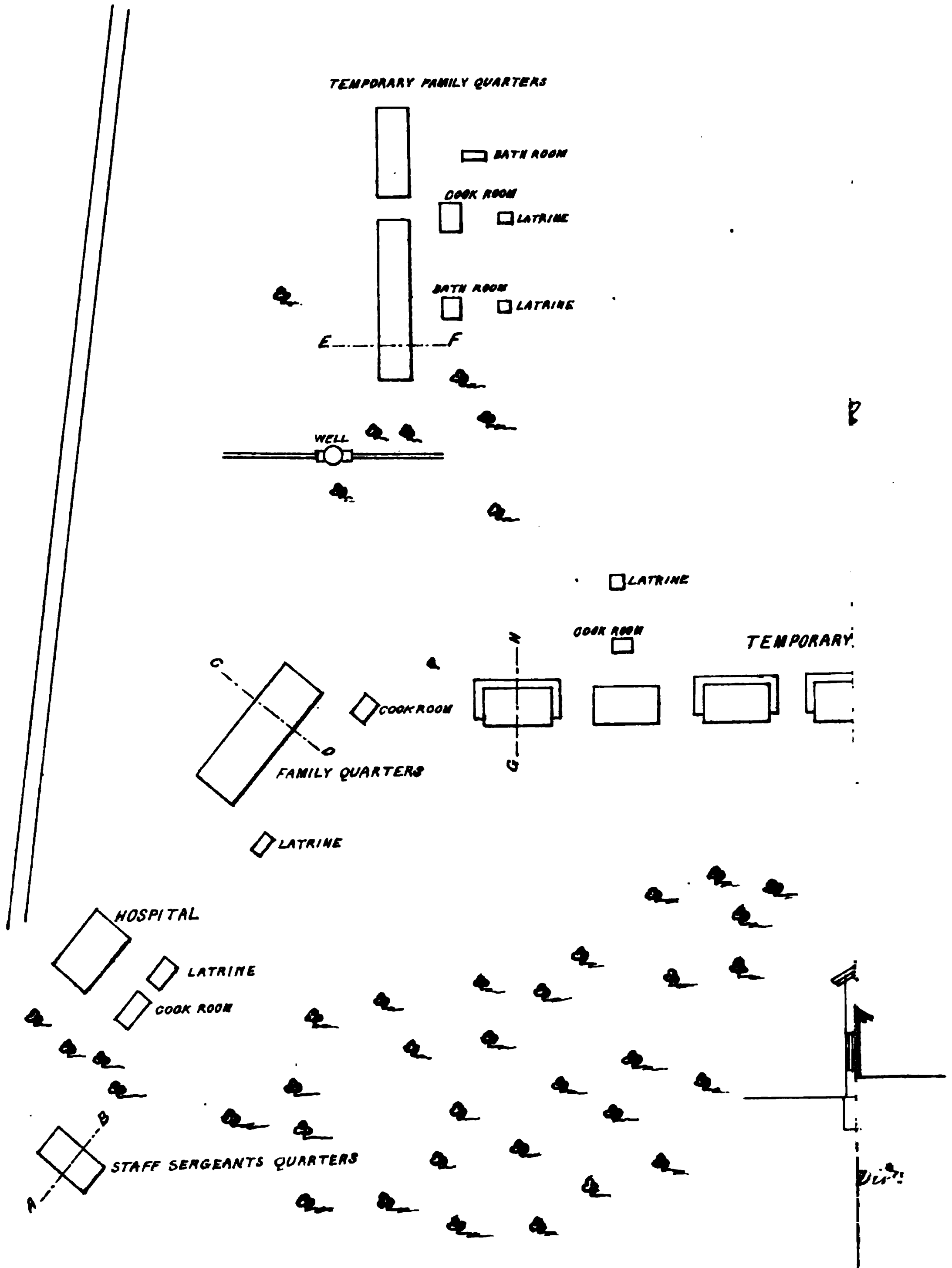

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ii. That a foul linen store-room be added to the Purveyor's store, by enclosing a small portion of the open verandah of the store room.

iii. That the latrines of both the Artillery and Infantry Hospitals be adapted to the "Dry Earth" system of conservancy, by provision being made for a covered earth store in the Sweeper's passage and in the latrine itself, and by substituting pillars, and sheet iron screens for the thick masonry brick wall, so as to bring the tubs within easy sight and reach of the attendants.

iv. That iron vessels be substituted for the tubs in use as urinals.

Reserve Barracks, (European.)

168. The buildings known as the Reserve Barracks were built in 1851, for a Native Cavalry Regiment, and were vacant for several years. In 1864 and 1865 they were occupied by a Garrison Battery of Artillery. In 1867 considerable alterations were made in them to accommodate the families of Her Majesty's 102nd Regiment of foot.

169. At the time of my inspection of them, they were temporarily occupied by the C Battery, D Brigade Royal Horse Artillery, which was in course of relief; but detained owing to Cholera having broken out at Secunderabad, for which station the Battery was under orders.

Site.

170. The site is to the south-east of Cantonments. The ground is elevated and possesses good natural drainage. There is a well of good water. Lines for a wing of a Native Infantry Regiment are upon the same site, but they are almost in ruins.

171. The buildings themselves need not be described in detail. They are all of the most temporary character and are used only as make-shift barracks under circumstances of pressure.

A block plan facing this page with cross sections of some of the buildings together with the "detailed statement of accommodation," afford all requisite information regarding the general arrangement of the barracks and their occupation at the time of my inspection.

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HER MAJESTY'S NATIVE TROOPS.

Lines of Her Majesty's 1st Regiment, Madras Native Infantry.

172. The lines, places of arms, hospital, and other public buildings of the 1st Regiment, Native Infantry, are situated on the left centre of the Cantonment in close proximity to the Sudder Bazaar or large Native Town of Kamptee, from which they are separated by a deep and wide nullah, known as the Bagdurra river. The Sepoys' lines lie between the Officers' houses and the "bells of arms," and the rows of huts of which they are composed, are very much crowded together, while the huts themselves are of a very inferior description and the roofs very low. This over-crowding of the lines was doubtless the cause of the "obstinacy with which Cholera frequently hung about them while the remainder of the Cantonment was almost free from the disease." This fact, was in June 1868, brought prominently to the notice of the Officer Commanding the Nagpore Force, by Deputy Inspector General Mr. Rennick, in a letter which I think of sufficient importance to quote.

Site and position.

"I do myself the honor to submit for consideration, a proposal, which, in my opinion, bears in a very important manner, on the sanitary condition of a part of the Cantonment.

(2.) "I am induced to make it in consequence of having had my attention directed of late to the obstinate manner in which Cholera hangs about the lines of the 1st Regiment of Native Infantry while the remainder of the Cantonment is almost free from the disease.

(3.) "A careful inspection of these lines does not show, either in their locality or their conservancy, any thing to account for the disease lurking there more than elsewhere, and its finding in them a more favorite habital must be set down to some other cause.

(4.) "In my opinion that cause is, their overcrowded state, and that I am justified in entertaining the opinion, is, I think, satisfactorily demonstrated by the following extract from my annual Inspection Report of the lines of the 36th Regiment, the same which are now occupied by the Wing of the 32nd.

'Very important alternations have been made in the lines of this Regiment since the last annual inspection, and with remarkably satisfactory results. Formerly their unhealthiness was notorious, and if not actually the focus where cholera was generated, the disease speedily found its way to them whenever it appeared in the Cantonment, while now they are not surpassed by any of the other lines in salubrity.

'The improvement was effected in this way.

'When about ten months back it was determined to locate a Wing of the Regiment permanently at Seetabuldee, the question presented itself how the huts about to be vacated were to be disposed of, and in what manner the condition of the remaining ones could be improved. It being evident that their unhealthiness was to be attributed mainly to their close confined and overcrowded state, it was resolved, not to demolish simply the huts of the Wing about to leave, but to remove every alternate row throughout the whole of the lines, to make a new allotment of houses to the men of the Wing that remained, and to spread them over a large area.

'The Wing marched for Seetabuldee on the 20th April last, and the work of demolition immediately commenced, the tiles and wood-work of the huts being carried there for the construction of the new ones, which the men had to build. Care was taken in throwing down the mudwalls not to disturb the soil or to open unused cess-pools that might have formerly existed.

'The rains which set in about this time facilitated operations, and the men of the Regiment, aided by a liberal pecuniary assistance from the Municipal Funds, were not long in opening out fine streets, some 60 feet broad in place of the narrow gullies, which had previously borne that name. A marked improvement was immediately observable in the health of the men. On more than one occasion the Hospital was without a patient, and when making the present inspection there was only one man on the sick list.'

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(5.) "The proposal then, to which I have the honor to solicit your attention, is to remove the present occupants of the Pensioners' lines to the new lines lately built near the reserve battery barracks, to increase the line accommodation of the 1st Regiment by adding to it the Pensioners' lines, to remove such huts or rows of huts in the 1st Regimental lines as may be considered to interfere with the free perflation of the air through them, and generally to spread the Regiment over a more extended area than it occupies at present.

(6.) "I am aware that this change cannot be effected without some outlay; but I feel assured you will agree with me that any measure having for its object the improved sanitation of the Cantonment should not be overlooked or set aside merely on the score of expense, and I think that the success which has attended the opening out of the 36th lines justifies us in entertaining the hope that similar satisfactory results will follow the adoption in the 1st Regiment lines of the proposal, I have now the honor to submit.

(7.) "I may add that since Cholera made its appearance in Kamptee, it has visited the 36th lines (two cases having occurred in them), but finding their condition unfavorable to its development it quickly disappeared."

173. I fully endorse Mr. Rennick's proposal, and advise that no time should be lost in thinning out the rows of huts so as to admit of free perflation.

The results obtained in the case of the 32nd Regiment as quoted by Mr. Rennick are most encouraging, and justify the anticipation of similar advantages in the case of these lines.

174. The removal of the Pensioners' lines to the locality of the reserve barracks will afford space for two rows of huts, while ground for two others might be taken up on the extreme left of the lines, the vacant space (shown on the block plan) near the Barrack Master's Office. These additional four rows would admit of a wide street being opened out from east to west instead of the small passages or alleys now existing, and doubtless add to the salubrity of the lines.

Public buildings.

175. The public buildings connected with the lines of this Regiment are but few, and comprise, bells of arms, quarter-guard, quarters for the Staff Serjeants, and hospital. These require but a brief description.

Bells of Arms.

176. There are ten of these structures, one to each Company, each 12′ × 12′ × 10′, and they are fairly adapted to their uses, though less convenient than the "Barracks", or places of arms provided in the Madras Presidency, and indeed in use by the 32nd Regiment at this station.

Staff Serjeants' Quarters.

177. The quarters provided for the Staff Serjeants are sufficiently commodious but indifferently ventilated, and said to be very hot. The Serjeant Major's quarters contain three rooms and two verandah rooms; the sitting room is 30′ × 14′ × 12′, the other two (bed rooms) 14′ × 14′. This building has a vaulted roof with turret ventilators. It is described as being very hot. The sectional area of the ventilators is too small and should be enlarged.

The Quarter Master Sergeant's quarter is a different description of building, has a terraced roof with ventilator and three rooms, 22′ × 22′, 22′ × 19′ and 22′ × 10′ respectively, with 15 feet height of wall.

Quarter-guard.

178. The quarter guard contains three rooms, one (the guard-room proper) 30′ × 14′ × 10′ with a superficies of 420 and a cubic measurement of 4,200 feet, the other two 15′ × 18′ × 8′, the guard room is ventilated by doors and windows only. It is sufficiently spacious.

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179. The hospital is old fashioned and obsolete in construction; it consists of a long narrow, tiled building ventilated by the ridge and by doors and windows, divided into two wards, one 137′ × 16′ × 16′, the other 28′ × 16′ × 16′. There are open verandahs on both sides, and the ends are enclosed to form rooms used as a Surgery, store-room, and bath-room.

Hospital.

180. The total superficial and cubic accommodation afforded in the two rooms are 2640′ and 42,240′ respectively. The superficies at 99 superficial feet per patient allows for 26·6 (say) 26 men. There were 32 sick on the date of inspection, or six in excess of the allotment at that standard. The accommodation is quite insufficient for a full Regiment, which, by the resolution of the Government of India, should be sufficient for 50 beds. The hospital was kept in very good order in every respect, beds and bedding clean, as also the building itself.

181. The latrine accommodation is detached. The privies are worked upon the dry earth system. Shallow earthern pans are arranged upon the floor in which some earth is placed; and a bucket with dry earth and a scoop, stands in the corner. Ablution waters escape through a drain, into the main (surface) drains. The privies were perfectly free from any ill odour.

Latrine.

The plan of the lines, with cross sections of the principal buildings, will further illustrate the preceding remarks.

182. The Conservancy of the lines is fairly attended to. The Court yards of those huts I inspected, and I took them at random, were well kept. Small screened off corners were used as bath-rooms and privies, and the latter were conserved upon the dry principle, the ordure being removed daily. In some instances dry earth was used. Although the arrangements do not ensure absolute freedom from absorption by the soil of some liquid excreta; the system is a great improvement upon the old "cess-pools" which have been entirely abolished in all Native lines at this station.

General conservancy of the lines.

183. The conservancy establishment consists of one cart and eight sweepers at a monthly cost of Rupees 66-15-0, one cart is not, however, enough for the due conservancy of the lines, and a second is supplied by the Municipality and "the men pay for about twenty additional sweepers out of their own pockets."

Conservancy Establishment.

184. No Regimental latrines exist; but conveniences of this description are liberally provided by the Municipality, and placed in convenient proximity to the lines of all Native Regiments. Their conservancy is carried out by the Cantonment Magistrate acting under the orders of the Cantonment Committee.

Latrines provided by Municipality.

185. There are nine wells in the lines, and the supply is said to be abundant and good. No analysis has been made.

Water supply.

186. The surface drainage of the lines is by open gutters in the soil, and is certainly defective. But little of the refuse water from the huts finds its way into the main drains, as the system is followed of catching such refuse waters in earthen vessels placed just without

Drainage.

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the Court yard walls. These vessels are said to be emptied daily; but some had manifestly not been emptied within the twenty-four hours preceding my visit. The system is, however, better than that of allowing refuse waters to flow on to, and be absorbed by, the soil.

The Officer Commanding is desirous to have the lines properly drained by open masonry channels, with provision for flushing from the numerous wells in the lines.

Health of Regiment.

187. The health of the Regiment at the time of my inspection was fair, the strength as per "present state" in Non-Commissioned Officers rank and file was 702, of whom thirty-two were in hospital or in the proportion of 4·56 per cent. As before noted sickness is prone to attach itself to the lines of this Regiment. The Officer Commanding informed me that they had lost fifty-five children from small pox, and forty-three of all ages and ranks from cholera since the arrival of the Regiment.

The following tables exhibit the principal features in the health of the Regiment since 1860.

Return showing sickness and mortality in the 1st Regiment M. N. I. during the years 1860-68.

Where stationed.	Hooshungabad, Chandah and Seroncha.							Kamptee.	
Years.	1860	1861	1862	1863	1864	1865	1866	1867	1868
Averge daily strength...	860	668	623	703	718	727	726	722	708
Do. sick... ...	47	15	15¼	24	38½	42	37¾	18⅞	20
Total admissions into Hospital	1,552	499	479	504	964	879	897	791	631
Do. deaths in Hospital	13	6	3	4	11	3	4	2	14
Do. admissions from Cholera	9	...	...	...	11	9	...	...	23
Do. deaths do. ...	3	...	...	...	5	3	...	...	8
Admissions exclusive of Cholera	1,543	499	679	504	953	870	897	791	608
Deaths do. do. ...	10	6	3	4	6	...	4	2	6
Ratio per thousand to strength of									
1. Daily sick	54·6	22·4	24·4	34·1	53·6	57·7	51·9	25·6	28·2
2. Admissions	1804·6	747·0	768·8	716·9	1342·6	1209·0	1235·5	1095·5	891·2
3. Deaths	15·1	8·9	4·8	5·6	15·3	4·1	5·5	2·7	19·7
4. Admissions from Cholera... ...	10·4	...	...	...	15·3	12·3	...	...	32·4
5. Deaths do. ...	3·4	...	...	...	6·9	4·1	...	...	11·2
6. Admissions exclusive of Cholera	1794·1	747·0	1089·8	716·9	1327·2	1196·6	1235·5	1095·5	858·7
7. Deaths do. do. ...	11·6	8·9	4·8	5·6	8·3	...	5·5	2·7	8·4

(Signed) C. M. CULLINAN, Assistant Surgeon,
In Medical charge, 1st Regt. M. N. I.

KAMPTEE,
18*th December* 1868.

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Return showing Admissions and Deaths from Principal Diseases in the 1*st Regiment M. N. I. during the years* 1860-68.

Admissions.

Years and where stationed.	Fevers.	Diarrhoea.	Dysentery.	Cholera.	Atrophy.	Anasarca et Ascites.	Diseases of the Lungs.	Diseases of the Liver.	Rheumatism.	Venereal.	Ulcers and Sores.	Wounds and Injuries.	Diseases of the Eye.	Diseases of the Skin.	Small-pox.	Dracunculus.	Total.	Other Diseases.	Grand Total.
1860 Hooshungabad ...	945	27	4	9	...	1	16	...	75	116	146	81	20	31	9	12	1,488	64	1,552
1861 Hooshungabad ...	255	8	5	...	1	1	2	1	70	23	74	27	14	4	2	...	484	65	499
1862 Hooshungabad ...	228	4	4	...	1	1	3	...	36	10	9	26	39	...	...	6	367	112	479
1863 Chandah and Seroncha ...	313	1	7	...	...	3	1	1	20	5	9	22	40	59	10	...	491	18	504
1864 Chandah and Seroncha ...	390	11	16	11	...	...	3	3	89	15	69	86	101	90	1	1	886	78	964
1865 Chandah and Seroncha ...	365	13	33	9	1	1	5	...	89	13	60	61	89	114	...	...	853	26	879
1866 Chandah and Seroncha ...	504	28	28	...	1	2	2	2	77	16	22	41	44	78	...	...	845	52	897
1867 Kamptee ...	403	40	8	...	...	...	2	...	71	8	23	67	47	59	...	1	729	62	791
1868 Kamptee ...	272	20	16	23	1	5	1	...	86	4	13	27	33	49	2	...	551	80	631
Total...	3,675	152	111	52	5	14	35	7	613	210	425	438	326	484	24	20	6,644	552	7,196

Deaths.

Years	Fevers.	Diarrhoea.	Dysentery.	Cholera.	Atrophy.	Anasarca et Ascites.	Diseases of the Lungs.	Diseases of the Liver.	Rheumatism.	Venereal.	Ulcers and Sores.	Wounds and Injuries.	Diseases of the Eye.	Diseases of the Skin.	Small-pox.	Dracunculus.	Total.	Other Diseases.	Grand Total.
1860 ...	5	1	3	3	...	...	...	...	...	...	...	1	...	...	...	...	13	...	13
1861 ...	3	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	4	2	6
1862 ...	1	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	3	...	3
1863 ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	4	...	4
1864 ...	1	...	1	5	...	...	1	...	...	...	...	...	...	...	...	...	...	3	11
1865 ...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
1866 ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
1867 ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
1868 ...	2	...	...	8	...	...	...	...	2	2	...	...	...	1	...	...	11	3	14
Total...	16	1	4	19	1	1	3	...	2	2	...	1	...	1	1	...	35	8	60

KAMPTEE,
18*th December* 1868.

(Signed) C. M. CULLINAN, Assistant-Surgeon,
In Medical Charge, 1*st Regiment N. I.*

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H. M.'s 32nd Regiment (Wing) M. N. I.

188. The lines of the left wing of the 32nd Regiment M. N. I., are to the right of those of the 1st Regiment N. I., and at some distance from them, being separated from them by the main guard, band stand, and general parade ground.

Site and position of lines.

The site is good. The lines of huts are built upon the northern slope of a ridge along the crest of which are placed hospital, barrack (or place of arms) and guard-room with the quarters of the Staff Serjeant.

189. The natural drainage is consequently very good and is effected by ordinary open ditches, into which the drains of the court yards of the huts discharge themselves. The refuse waters are not, as described in the case of the 1st Regiment N. I., received into vessels.

Drainage.

These lines were formerly as over-crowded as those of the 1st Regiment, but when it was decided to accommodate a wing only of the 2nd Native Infantry corps at this station, alternate rows of huts were removed and wide streets opened out. Since that period the health of the lines has greatly improved. The contrast between the airiness of these lines, and those last described, is very great.

190. The general conservancy of the lines is carried out precisely as in the 1st Regiment. The Court yards of sepoys' huts have screened bath-rooms and privies, all excreta are removed daily, and every family is directed to keep a vessel of dry earth mixed with ashes, at the privy for use as a deodorant. The order was duly carried out in the yards I inspected.

General Conservancy.

191. The conservancy establishment consists of one cart and four sweepers (the authorised establishment for a wing of a Regiment) at a cost of Rupees 42-8-0 per mensem. Besides this each occupant of a house pays nine pies towards a fund for house conservancy.

Establishment.

There are no public Regimental latrines: but municipal latrines are in convenient proximity to the lines, though not much used by the sepoys.

192. There are three wells in the lines the water of which is said to be good, but no analysis has been made. The river water is mostly used for domestic purposes.

Water supply.

193. The Barrack or place of arms, guard-room, defaulters' room, and stores, are under one roof. Those portions of the building assigned to the arms and stores are well suited to their use, and require no description.

Public buildings.
Barrack.
Guard-room.
Defaulters' room.

The *guard-room* is 59′ × 8′ × 8′ giving a superficies of 472′ and a cubic measurement of 3,776 feet. It is badly ventilated, indeed without ventilation when the doors and windows are closed. The defaulters' room is even worse. It has one door and one window, which were closed when I entered it. Both these rooms require ventilation which could be found at small cost by openings at the top of the wall, barred in the case of the defaulters' room.

The room assigned to the Native Officer of the day also requires ventilation.

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Staff Serjeants' quarters.

194. The quarters for the Staff Serjeants are in one block and are sufficiently commodious and comfortable, and ventilated by the ridge.

Hospital.

195. The hospital is much of the same description as that of the 1st Regiment N. I; a long building consisting of a main ward. 118′ × 16′ × 11′ and two rooms (one used as a spare ward the other as a surgery and office) each 12′ × 6′ × 8′ with a front and rear verandah.

The hospital wards afford a superficies of 1,960 feet, and accommodate at the standard allotment of 99 superficial feet, 19·8 say twenty men. By the detailed statement of accommodation given me, the recorded allotment is forty men. There were fifteen sick on the day of my inspection. The accommodation sufficies for a wing, though it is not quite equal to the allotment under the standard plan.

The latrines were well kept upon the dry earth system, and the general conservancy of the whole establishment well attended to.

Solitary Cells.

196. The Regimental solitary cells are two in number arranged back to back. They are very small only 8′ × 8′ × 11′ = to 64 superficial and 704 cubic feet. Each cell has a small attached privy. The ventilation is by barred openings at the top of the walls.

A block plan of the lines and cross sections of the buildings face this page.

Summary.

197. The hospital accommodation then for the Native Infantry Regiments is old and obsolete, the wards narrow, the ventilation indifferent, and the accommodation, if judged by the allotment according to the new standard plan of Native hospitals, insufficient.

Health of Regiment.

198. The health of the wing of the Regiment as evidenced by the number of sick in hospital, 15 equal to 4·7 per cent. of strength is fair. Of the 15 sick in hospital, 6 or 40 per cent. were cases of malarious fevers.

H. M.'s 1st Regiment Light Cavalry.

Site and position of Lines.

199. The lines of the Native Cavalry are situated at the extreme right or east of Cantonment upon an open, elevated, and airy site. The Officers' houses are nearest the river. Then come the horse lines, and beyond them the sepoys' lines. On my arrival at Kamptee, the 1st Regiment of Light Cavalry had just come in, and was scarcely settled down, so that the conservancy of the lines had been hardly brought under complete organization. I found the lines, however, very clean. The sepoys' huts are of a better description than those of the Infantry. Each hut is detached from its fellow, and the court yards are spacious. There is consequently more free circulation of air. The streets are wide and kept very clean. The site is good, a crest or ridge, with sloping ground both to north and south rendering natural drainage good. The main street runs east and west.

Conservancy.

200. The conservancy of the Sepoys' huts is carried out on the same system as already described in relation to the Native Infantry Regiment.

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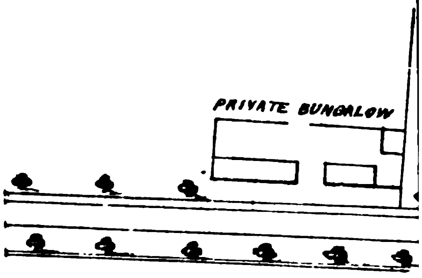

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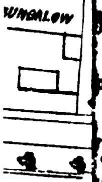
1. The places of arms and saddle-rooms are six in number, and are in a row to the south of the Horse lines. Each is 58′ × 18′ × 13′ with a back and front verandah and ridge ventilation.

buildings.

2. The guard-room is between the places of arms, and is termed "Standard" in the statement of accommodation furnished to me. It contains one guard-room proper 25′ × 16′ × 12′—one defaulters' room 16′ × 8′ × 12′ and an open verandah. It is ventilated by ge and by windows high in the walls.

om.



3. The Staff Serjeants have two quarters in one block. Each quarter comprises two rooms 17′ × 15′ and 15′ × 15′ respectively, with small verandah rooms 7′ × 6′. The cook-rooms, wash-house, y, are detached. The building is ridge verandah ventilated and has swing windows the roof. The accommodation is good and comfortable. One quarter ied by the Apothecary.

ts' quarters.

I do not think it necessary to describe the buildings noted in the margin. I may observe, however, that a building said to have been designed as a "Sick lines" is used as a porter godown by the Commissariat. The "Sick lines" in occupation were, formed, designed as a shoeing shed.

s.
and its

The hospital is located upon an elevated airy site to the east of the lines, and has a north and south aspect. It consists of one long room communicating by open arches with enclosed s, which communicate with the open air by doors only. Every second alf glazed. The ends of the verandahs are divided off into four small ch 12′ × 10′. The building is not ventilated by the ridge, indeed has no on, but that dependent upon doors and windows.

long ward is 145′ × 20′ × 14′ has a superficies of 2,900, and a cubic ment of 40,600 feet. It thus affords accommodation at 99 superficial say, thirty men.

accommodation then is in excess of that allowed in the standard plan for Native Cavalry.

means exist, however, of segregation of any particular cases, or class of d I would recommend that the room be divided into three, or at any rate, partments each to be ventilated by the ridge, independent of its fellow.

The hospital is drained by an open masonry channel running all round the building.

subsidiary buildings comprise a cook-room and store-room, and a latrine. er is well kept upon the dry earth system. There are no quarters for cal Subordinate (Native Dresser) near the hospital. Accommodation e provided.

Between the hospital and the lines are two mud and grass thatched buildings with tiled verandahs formerly run up for the temporary accommodation of British Cavalry. They are now used eters' and Farriers' quarters. They are shown upon the block plan with ion of their subsidiary buildings.

barracks.

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Solitary Cells. 207. Two, arranged in the same way as those for the Infantry, lie between these buildings and the hospital.

208. There are numerous wells as shown upon the plan in the neighbourhood of the lines, hospitals, and horse lines which yield a sufficient supply of good water. No analysis of the waters has been made.

Water supply.

209. The block plan, with cross sections of the different buildings, will afford all further information regarding the accommodation provided for the Native Cavalry.

The only suggestion I have to offer is the improvement of the hospital as noted above, viz., its division into 2 or 3 wards and ridge ventilation of each.

210. The Regiment having so recently arrived its health status is not affected by residence at the station. There were eleven sick out of a strength of 308, or in the proportion of 3·5 per cent. Of the eleven cases of sickness, four are fevers, or 36 per cent. of the whole. The approximate number of residents in Regimental lines is 2,593 souls.

Health of Regiment.

Detail Hospital.

211. The hospital for the treatment for the sick of "the details," that is of Native Military sick not regimental, and of the employès in the different Departments Military and Civil, is at the eastern extremity of the lines of the 1st Regiment N. I., close to the Pensioners' Lines.

This building resembles those of Native Infantry corps, but is not ridge ventilated. It consists of two rooms, one 92'×16'×11½' the other 26'×16'×11½' The former is assigned to Natives, and the latter to European sick. The superficies of each is 1472, and 416 feet, and the accommodation is equal to 15 and 3 at the allotment of space assigned to Natives and Europeans respectively.

212. The Europeans who are entitled to admission in this hospital, consist of Warrant and Non-Commissioned Officers of the Cantonment Staff, not belonging to Her Majesty's *British* Forces. Sick of the latter are admitted when necessary into the hospital Her Majesty's British Troops. The European ward is very seldom in use as the class of persons for whom it is provided, are treated at their own quarters except in very exceptional instances, as in cases of mania, delirium tremens, and when hospital treatment may be essential.

European ward.

213. The accommodation for Natives is scarcely more than is required for Military sick. Cases of illness or accident occurring amongst Native employès in the several departments, and amongst grass-cutters, and horse-keepers of the mounted branches of the service are transfered to the Civil hospital.

Native Ward.

214. The hospital is indifferent even of its kind, but appears to meet the requirements of the department under ordinary circumstances; but it is manifest that in the event of epidemic disease appearing amongst the "details" the accommodation is quite insufficient, and would have to be supplemented by tents.

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215. The out-houses comprise a cook-room, store-rooms, and latrine. The latter I found to be very well kept upon the dry earth system, shallow earthen vessels half-filled with dry earth standing upon the floor, being in use, as generally practised in latrines of native hospitals at this station. I suggested to Dr. Rennick, the Deputy Inspector General, that in the latrines generally of Native troops it would be better to partition off a portion of the flooring by a masonry ledge about four inches high, the portion thus divided off to be kept full of dry earth or sand, upon which the vessels should be placed so as to absorb any moisture; to abandon the use of white wash, and the practise of washing the floors, and to keep them clean by scrubbing them occasionally with dry earth or sand. He was pleased to express his approval of this plan, and intimated his intention of carrying it out in all Native hospital latrines.

Out-Houses.

216. The internal economy of the hospital was carefully attended to, the sick were in every way well cared for. The beds and bedding clean and general conservancy every thing that could be desired.

I do not consider it necessary to append a plan of this hospital.

Lock-Hospital.

217. The Lock-hospital is situated upon an open and airy site to the south of the 1st Regiment Native Infantry Lines upon the banks of the rivulet known as the Bagdurra river. The position is rather an exposed one, that is the building rather obtrudes itself, as it is close to a new ride recently made round the Cantonment.

The building is a sufficiently convenient one and consists of three rooms, two of which are used as wards, and one as an examination room. The wards are airy and well-ventilated, and were very clean when I inspected them, as also the bedding. The out-houses are also convenient. The whole are enclosed within a high wall, except the latrine which projects beyond the enclosure. The position of the building is shown upon the block plan of the 1st Regiment N. I.

218. The ablution room is fitted up with an apparatus for the efficient ablutions so necessary in the treatment of the cases admitted, and consists of a tub at a high level to which is attached a flexible tube so that a powerful jet of water is ensured by hydrostatic pressure.

Ablution room.

219. The latrine is well kept on the system already noted in connection with other Native hospitals, but I advised the modification noted in paragraph 215.

Latrines.

220. The Institution was established in November 1866, under the provisions of Act XXII of 1864 (Bengal.) The Chowdrany system is in operation, and the Medical Officer in charge (Dr. Williams,) reports that it "works fairly." Registration, Dr. Williams informs me, is permissive and medical examination enforced only amongst those known or supposed to associate with European troops, with others it is optional; but the Chowdranies of Divisions are supposed to examine them. This fact militates much against the value of the institution, as I think it is not possible

Administration of the Institution.

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to draw the line between women who associate with Europeans, and those who do not. Besides which, it is the intention, I apprehend, of Government that the general population should be protected against the ravages of venereal disease equally with the soldier, certainly that Native troops should have the benefit of the protection afforded by the Act.

221. It has been shown by Mr. Rennick, as referred to by me in my last Annual Sanitary Report, that many women have left the Cantonment for Nagpore and Seetabuldee, thus rendering the Act largely inoperative, and its extension to the latter station is advocated. Full protection to the troops and all classes will not be afforded till the Contagious Diseases Act is extended to Nagpore and Seetabuldee.

Registered prostitutes.

222. The number of registered prostitutes within the limits of the Cantonment of Kamptee is 114, 41 of whom are Mahomedans, and 73 Hindoos. There are no registered European or East Indian women.

223. But although the institution has not been of that utility it is capable of attaining to, it has, writes Dr. Willlams, "reduced the per-centage of venereal disease amongst the European troops, and the disease is diminishing yearly."

In illustration of this Dr. Williams put me in possession of a table showing the strength and admissions for each month of the years 1867 and 1868, from which it appears that during 1867 the admissions by venereal amongst the European troops were in the ratio of 23·45 per cent. to strength, and during the eleven months of 1868, 19·37, showing a reduction of 4·08 per cent. The figures for 1867 do not agree with those deduced from the returns at my command for the compilation of the Annual Sanitary Report for 1867, by which the ratio is stated at 287·8 per mille, or reduced to a per-centage 28·78. But even the figures obtained from Dr. Williams' tables do not exhibit any very considerable reduction upon the averages of previous years. I do not in fact think that we can affirm that the Lock Hospital, under the present working of the system, has materially reduced the prevalence of venereal amongst European troops. Compulsory registration and examination of all prostitutes whether known to consort with Europeans or not, and the introduction of the Contagious Diseases Act into Nagpore and Seetabuldee, now apparently the refuge for all women who decline to register at Kamptee, will alone afford that complete protection which is so desirable.

Civil Hospital.

224. The building now used as a Civil hospital was formerly a Jail. It was first occupied as a Hospital and Dispensary in 1866. Although termed a Civil hospital it is under the Medical charge of a Military Surgeon as it is situated within Cantonment limits.

225. The building is quadrangular enclosing a paved court yard. The rooms on either side of the entrance are devoted to administrative purposes. The wards for the sick have been formed by throwing the old cells into each other by large arch-ways. The rooms are well ventilated. The doors are barred, the lower half being closed as required by a hinged shutter. The building is ventilated by the ridge and is very airy. It necessarily retains many of the

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characters of a prison about it, but the Native sick are said to prefer it, to more spacious and better designed hospitals.

226. The whole building was remarkably clean on the date of my inspection.

Condition and Conservancy.

The interior economy of the institution was efficient in every particular. The latrines were remarkably well kept, and the sick were clean, cheerful, and contented.

227. The institution is supported partly by a grant from the Municipality of Rupees 125 per mensem, and partly by private subscriptions, but the latter are falling off. It has been proposed to encourage Native gentlemen to support it by naming the wards after liberal donors.

228. The accommodation is equal to about twenty patients at 99 superficial feet per bed; but the building is so well ventilated that so large a space need not be given.

229. The equipment of the hospital is sufficient and in good order, and the condition in which I found the institution is very creditable to the Medical Officer in charge.

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NAGPORE.

230. It is not within my province to write a topographical sketch of the Ci Station of Nagpore, the Head Quarters of the Chief Commissioner, as it is und the Sanitary cognisance of the Sanitary Commissioner to the Central Provinc I shall limit my remarks, therefore, to the accommodation provided for the detac ments of troops, European and Native furnished to this important out-post fr Kamptee, and, first—

Her Majesty's British Troops.

231. The accommodation for Her Majesty's British Troops is within t Fort, upon the Seetabuldee Hill, at an elevation of about 120 feet above the pla The existing accommodation comprises one (old) barrack for 50 men in the low Fort with its subsidiary buildings. A new barrack for a half Company, upon t standard plan, in the upper Fort is finished, and at the time of my inspecti was occupied as a temporary arrangement by the C. Battery, D. Brigade, Ro Horse Artillery, in course of relief, and which had marched from Kamptee a f days previous, but was detained owing to cases of cholera having been reported the road to Bombay.

Permanent Garrison.

232. It has been determined by the Government of India, that accommo tion is to be found at this station for one Company of Infant and a Garrison Battery of Artillery. An additional half Co pany barrack is to be built within the upper Fort, and the present barrack in t lower Fort is to be removed, and a new one built upon the same site for the Batte of Artillery. The works are, however, at present held in abeyance, pending t measures to be adopted for supply of water, as the well within the lower fort not fit for use for domestic purposes, the water being brackish.

233. The existing accommodation then comprises one half Company b rack for the Infantry in the upper Fort, and one old one in the lower. The up one only will be occupied when the detachment of Her Majesty's 90th Regim (now daily arriving at Kamptee by transit from Jubbulpore) is sent out.

New Barrack.

234. This barrack is a stone in chunam building up the standard plan for a half Company, and is an imposi building. It occupies the eastern side of the Fort close (much too close) to Magazine. It ranges north and south nearly, so that the prevailing winds ha free access to its sides, while the elevation ensures a moving atmosphere ev while in the plain below it may be stagnant. The freshness of the air at t elevation contrasts markedly with that below, and I am assured that in the weather, when it is almost impossible to get a nights rest in the station with the punkah or even thermantidote, it is comparitively cool and pleasant upon hill.

Description of Barracks.

235. The soil upon which the barrack stands is trap rock. The barrack c sists of a body and two wings. The central portion is oc pied by the men's dining room, a spacious well lighted ap ment, and quarters for Non-Commissioned Officers, beyond which in each wing

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spacious and well lighted barrack room. The roof is of corrugated iron painted blue over which is a stuccord terrace roof about one foot thick. The doors (no windows) are panelled, but above each is a fixed glazed window, and above that again semi-circular fan-lights, hinged below, and capable of being opened or shut by ropes and pulleys.

Ventilation.

236. Ventilation is effected by the doors, (when open) and the fan-lights above the doors and, by the same provision, (swing windows) in the men's rooms around the top of the walls.

As the doors are entirely panelled, when closed, ventilation must be imperfect, since air can enter only high upon the walls, and there must be more or less stagnation of air upon the floor and around the men's beds. I think that half of each door should be glazed, and if glazed upon the double-ventilating pane system, it would ensure a free entrance of air without draught.

Perforated zinc plates with shutters to regulate the entering current might, I think, also be inserted in the lower panels of the doors with advantage, so as to insure some ground ventilation. These perforated zinc plates would guard against draughts by allowing the air to enter only in finely divided rills. Certainly, under present arrangements when the doors are closed, the ventilation of the body of the rooms must be deficient.

The arrangement of the fan-lights should also, I think, be altered. They should be made to swing upon a horizontal axis, and be capable of being closed only to a given extent, just so far as to exclude driving rain, but so that some air may always enter. Now, they can be entirely closed, and, from my experience of this kind of window, will, as a rule, always be closed and become liable to get jammed in their frames.

Latrines.

237. At the ends of each wing is a latrine each provided with two seats, with a recess for a urinal. The rear wall separating the latrine from the sweepers' passage is so thick that the apertures for removal of pans are inconvenient, as explained in relation to the latrines of the force at Kamptee. This wall should be replaced by a sheet iron or wooden screen, so as to facilitate the operations of the sweeper, especially in the application of dry earth.

Ablution rooms.

238. The wash-houses are not yet built. Indeed the barrack, though temporarily occupied as above noted, has not yet been formally made over.

Old Barracks.

Latrines.

239. The old barracks need not be described in detail. They are soon to be abandoned for the new building. The Subsidiary accommodation is indifferent, and the latrines are bad as they consist of masonry seats white washed, with channels from them to convey urine into vessels outside. Dry earth is *not* used, but lime wash *is*. I need scarcely say that they were not sweet.

Plunge-bath.

240. A plunge-bath exists on the terrace (the lower Fort) which is supplied by a well on the spot, the water of which is not fit for domestic use.

241. Plans of these buildings are given. The new barrack is superior to any I have yet seen, and when the additional buildings are completed, making provision for another half Company of Infantry and a Garrison Battery of

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Artillery, the accommodation will be every thing that can possibly be desired and far in advance, I believe, of any barrack accommodation out of India.

242. So long as the old Barracks are occupied attention should be paid to the conservancy of the latrines, which even under their faulty principles of construction can be much better kept. Dry earth should be used.

H. M.'s 36th Regiment M. N. I.

243. The Head Quarters and five Companies of H. M.'s 36th Regiment constitute the Native troops garrisoning Nagpore.

Site and position.

244. The Regimental Lines, which I am informed, were built about two years ago, are located at Taklee upon the very worst site in the neighbourhood, a low tract of black cotton soil, to the north east of an elevated plateau upon the slope of which the lines of the 18th Regiment were formerly situated. Certainly all sanitary considerations were lost sight of in the selection of the present site, and it is difficult to conceive how any one having the least eye to locality, and the general features of country, could have put a Regiment down in the hollow in which the lines now sta I am assured that in the rains the ground is swampy, the soil spongy and la with moisture; and its physical features prove that this must be the case. the immediate neighbourhood at distances varying from 300 yards to a qua of a mile far better sites might have been selected. I gather that the Li of the 18th Regiment were removed from the elevated and well drained they occupied owing to the great prevalence of fever attributed to the expo position, but bringing them down from the slope of a ridge to the low grou at its foot, was scarcely likely to improve matters. I cannot understand w the ground formerly occupied by the Irregular Force was not selected. It h all the advantages of a compact Cantonment within itself; an elevated site pr tected by numerous trees from emanations from lower grounds, public buildin capable of being utilized, and sufficient bungalows for the small number of Offic attached to Native Regiments under the present organization. This site has bee however otherwise appropriated, having been made over to the Police and oth Civil establishments.

Sepoys' Lines.

245. The huts of the Sepoys' lines are of the ordinary construction, and a tiled. The court yards are sufficiently spacious. The ma streets trend in an east-north east, and west-south west dire tion and are pierced at right angles by a central wide street. The main stree have eighteen feet, and the smaller ones fourteen feet of road way, and hav well kept ditches on either side. There is sufficient fall to the north-east to adm of efficient drainage of the ground itself, but although no water lodges in th lines, it does just beyond them; while the ground upon which the Staff Ser geants' quarters are located, is represented to be a perfect swamp in the rains.

Court yards of Sepoys' Lines.

246. The court yards that I inspected were well kept; a space was screene off, in some instances by a mud wall in others by a bambo mat, as a latrine, all of which are kept upon the dry system the excreta being removed daily. In some "dry earth" is used in others not. I advised the Officer 2nd in Command, who accompanied me in my inspection to adopt as a standard one of the latrines I inspected in which the area was paved;

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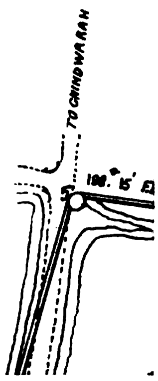

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compartments being formed by stones for the convenience of the frequenters of the latrine, and a basket of dry earth kept for use.

The Lines looked neat and well kept, though the huts are of an inferior description.

Danage.

247. The drainage of the court yard is effected by holes in the walls leading to the ditches outside; I advised the introduction of tubular drain tiles of Native manufacture, and the receipt of the drainage waters in common earthen vessels outside, to be removed, as in the 1st Regiment at Kamptee, and emptied daily instead of as now allowing refuse waters to flow into, and be absorbed by, the soil.

Latrines.

248. Latrines exist near the lines for men only. I could not gather from the Regimental authorities whether they were built out of Imperial or Municipal Funds.

Conservancy.

249. The conservancy of the lines is maintained by an establishment of one cart and four toties; but an additional cart is provided by the municipality. All excreta and filth are removed to a pit about $\frac{3}{4}$ of a mile from the lines. This pit is provided by, and its conservancy maintained under, the orders of the municipality.

Water supply.

250. The water supply is derived from seven wells, the principal supply is drawn from a well near the Magazine. No analysis has been made of it, but it is reported to be soft and good for domestic use.

Staff Sergeants' Quarters.

251. There are two separate bungalows for the Staff Sergeants. No. 1 was unoccupied. It is good as to accommodation, that is as regards number and size of rooms. The roof is tiled. There is no ventilation whatever except by doors and windows. The former are half, and the latter wholly glazed. The basement has no elevation above the soil.

No. 2 is ocupied by the Sergeant, Major and has ample accomodation, but like No. I quarter it is built on the ground, and has no ventilation whatever. The rooms smelt close and stuffy, and the atmosphere was certainly foul.

When I write that the Sergeant-Major and his wife were both stricken with fever last year, and had to go away to recruit their health; that the latter was, on the date of my inspection, again ill with fever, and that last year they lost two children, I need scarcely offer any suggestions for the improvement of the buildings. They ought never to have been placed where they now stand, and other accommodations should be found for the Staff Sergeant and his family.

Barracks, Hospital, Guard-room, &c., &c.

252. The places of Arms, Guard-room, Defaulters' room, Hospital, Detail Hospital, and Apothecary's quarters are all found in one building, consisting of a body and two wings. The site is somewhat more elevated and drier than that upon which the lines are built, and natural drainage is good. The body of the building is given up to the barracks proper and includes two places of Arms, the Guard-room, Defaulters' room, Conjee-room, and Store-room. The right wing is the Regimental Hospital, and the left the Detail Hospital and Apothecary's quarters. To the rear (the fourth side of a square) are placed the subsidiary buildings as cook-rooms and latrine.

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The position of these buildings in relation to the lines is shown upon the Block Plan. The assemblage of Barracks and Hospitals under one roof, and the quadrangular form of the building are faulty and objectionable.

I do not consider it necessary to describe the rooms assigned to the Arms or to Stores. The Guard-room and Defaulters' rooms and the Hospital must be briefly noticed.

Guard-room.

253. The Guard-room is situated in the front of the building, and is 34′ × 18′ × 14½′ by a plan before me, (which I do not think it necessary to give,) and 33′ × 18½′ × 13′ by the detailed statement of accommodation. The latter measurements give a superfices of 610, and a cubic measurement of 7,930 feet.

The strength of the guard is twenty-five men, of whom thirteen occupy the room at night. This gives 47 superficial and 500 cubic feet per man. The room is ventilated by two doors and two windows and by the ridge.

Defaulters' room.

254. The Defaulters' room has one door and two barred windows at top of walls, and is well ventilated. There are other solitary cells near the European Barracks available, if necessary, but no occasion has been found to occupy them.

Regimental Hospital.

255. The sick of the Regiment are accommodated in the right wing of the building in three rooms 57½ × 18½, 12½ × 18½ and 20½ × 18½ respectively, with a height to wall plate of 14½ by plan and 13 by statement of accommodation. The superficies of the first room equals 1,064 feet, of the second of 231, and the third of 379, giving a total superficies of 1,674 feet, which divided by 99, the standard allotment per bed, equals 16·8, say 17, the number of sick for whom accommodation is afforded. But the Medical Officer in a Memorandum now before me assigns thirty-two as the number of sick, the Hospital is capable of accommodating, evidently in ignorance of the fact that 99 feet has been assigned as the superficial space for Military Native sick. There were only twelve sick on the date of my inspection, so that there was no overcrowding. I found also at Kamptee that it was not generally understood that the allotment of superficial space for Native sick had been fixed at so high a standard as 99 feet, and that there was therefore a tendency to crowd patients.

Ventilation.

256. The Hospital is ridge ventilated. The doors and windows are glazed.

Ablution rooms.

257. Two small verandah rooms are used as ablution rooms.

Latrine.

258. The latrine is detached. It occupies, with the Hospital and Apothecary's cook-rooms, the fourth side of the square. It is built upon Dr. Hathaway's principle, and was kept remarkably clean. The walls are low, the roof being supported on pillars only, so that there is free ventilation. Apertures exist for the removal of the shallow earthenware vessels which are kept upon the dry earth system.

Cook-rooms.

259. The cook-rooms are convenient; the hospital cook room has an attached store room.

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260. The sick "details" are accommodated in one room in the left wing of the building 30′ × 18½′ × 12′, with a measurement of 555 superficial and 6,660 cubical space. It affords accommodation for about six sick. It is not ventilated by the ridge as is the Regimental Hospital.

Detail Hospital.

261. The quarters for the Apothecary comprises two rooms 18′ × 28½′ × 12,′ with an attached bath-room and a detached cook-room and privy. They are convenient and comfortable enough, but the bed-room communicates by a door-way with the Hospital ward, which is objectionable as interfearing with privacy. The apothecary requests that this door-way may be bricked up.

Apothecary's quarters.

Standing Camp.

262. A camp is kept standing at this station for the convenience of troops during the season of relief. It is situated close to the railway station upon an open space of cotton soil. Roads have been made dividing the camp into four sections, one assigned to the Commissariat Department, one to latrines and wash-houses, and the other two to the camp proper. At the time of my inspection there were forty tents pitched for men, five for Officers, ten for families, and four for Hospitals. Each tent was for the accommodation of eight men, and each family tent for two families. The camp was perfectly clean, and the conservancy arrangements good.

Six sweepers and two carts are entertained.

263. There are separate latrines for officers, men, and women, all upon the same plan, built of wood and matting. Fixed wooden seats are provided, and dry earth is strewed beneath them; the excreta are removed through small openings in the mat wall, by the sweeper on duty, in the passage. The men's latrine is in three compartments of ten seats in each. No privy tubs are provided. The latrines were free from any bad smell. The camp, however, had but few occupants on the date of my inspection.

Latrines.

Lavatory.

264. A tent constitutes a wash-house for men; ten half casks are provided. There is no lavatory for women.

Water.

265. There is a good well upon the ground with an abundant supply of water, which is reported to be soft and good.

Carriage.

266. Carriage is available for the transit of ninety men a day.

267, The rations I inspected were good. The beef very good. Mutton is rarely if ever supplied to the camp. The Sergeant in charge told me he had seen none since the 19th October. The vegetable ration was excellent; a part of it consisted of Cauliflower, but this is an exceptional issue.

Rations.

The condition of the camp was creditable to the Officer in command, and Medical Officer in charge of it. The ground was remarkably clean and welkept, and general conservancy well attended to.

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GENERAL RECAPITULATION.

I may, in conclusion, briefly epitomise the principal points to which attention has been directed in the preceding pages.

Removal of the entire European Force to Blogg's Drive advocated.

268. The unsuitableness of existing barracks for the accommodation of British Troops has been demonstrated by the highest Military authority, the Commander-in-Chief in India; and the Government have accepted His Excellency's verdict. All existing buildings are, therefore, considered semi-permanent only, to be replaced at no distant period by new structures in accordance with standard plans in force. Site plans for the location of the new barracks for the Artillery have already been submitted.

To these sites I have advanced objections, which are in my judgment of considerable weight; and have advocated removal of the entire European Force to Blogg's Drive upon grounds which I have carefully set forth in the special report in the appendix.

New hospitals for British Troops necessary.

269. Entire reconstruction of the hospitals for British Troops, I also advocate as I consider that the existing buildings are incapable of being altered or remodelled. They are in fact worse as hospitals than the barracks are as barracks.

Barracks and hospitals in two stories necessary to guard against miasmatic disease.

270. I have also advanced that the necessity for raising the men from off the ground, by placing them in upper stories owing to the great prevalence of malarious fevers at this station, is urgent.

271. Anticipating the construction of entirely new barracks and hospitals, I have no recommendations to make involving alterations of existing buildings except in the following instances which will not necessitate any great outlay:—

i. The substitution of glass windows for the panelled ones at the barracks of the Infantry and Artillery, and the introduction of the double-ventilating pane, in the upper sections of the same; with perforated zinc plates in the lower panels of the doors so as to ensure better ventilation.

ii. The addition of a light open verandah to the south face of the Artillery hospital, to screen the wall from the direct action of the sun, and to admit of the use of wet tatties in the hot season.

iii. The conversion of the European latrines generally, so as to adapt them to the dry earth system. This to be effected by substituting sheet iron for the thick masonry walls now constituting the back walls of the privies, in view to bringing the utensils within easy reach, and observation of the sweepers in waiting in the rear passages, and the provision of shoots for the delivery of a charge of earth after each use of a pan.

Hospitals of Native Regiments.

272. I do not think it necessary to make any suggestions in regard to alterations of buildings allotted to Native Troops. The *hospitals*, however, are obsolete, and in no way approach in accommodation, the standard now laid down for Native Hospitals, and in course of years, no doubt, will give place to new buildings.

The hospital of the 1st Regiment Light Cavalry may, however, with advantage be altered as suggested at page 53 paragraph 205.

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273. I strongly advocate the thinning out of the Lines of the 1st Regiment Native Infantry, by ejecting the pensioners, and removing them to another locality, and by occupying the ground thus vacated, and that available at the west end of the lines, by rows of new and better description of huts, and by piercing the lines at right angles from east to west by a broad street.

Lines of Native Regiments.

274. The question of removal of the Commissariat cattle lines is connected with that of the location of the new European barracks. If the latter are to be built upon the sites marked out, near the existing lines, the Commissariat cattle lines and the Native town that has grown up around them, must in my judgment be removed to the other end of Cantonment; but if Blogg's Drive be selected as the site for the new barracks, the Commissariat establishment need not be disturbed.

Removal of cattle lines.

275. I refer to my special report in the appendix on this subject. I advocate the removal of the sanitarium or Convalescent Depôt from Chindwarrah to Chiculda upon grounds set forth in that report. I would also utilize that sanitarium more than Chindwarrah has hitherto been, by providing accommodation for at least 200 men and their families, allowing them to remain from the commencement of the hot, to the termination of the rainy, season, or, say from 1st April to 31st October, when they would rejoin head quarters (leaving such sick or delicate men as might require a further residence through the cold season) to be replaced by another selected body the following year. It is also worthy of consideration whether a working party might not be employed in building the new barracks, and making the roads upon the plateau.

Sanitarium.

276. The proposal to remove the entire European Force to Chindwarrah has been so forcibly negatived by the Government of India, that I have merely alluded to it.

Removal of British Troops to Chindwarrah.

The climate of that station would, there is every reason to believe, be far better suited to the European constitution than that of Kamptee.

277. Should my suggestions in regard to the utilization of the Chiculda hills as a sanitarium be adopted and prove successful, it may be advisable to extend the accommodation and permanently station there a larger body of troops.

Chiculda as a sanitarium.

278. At Nagpore the only recommendations I have to make are, that the conservancy of the latrines of the old European barracks should be improved, and that the quarters in the Native Infantry Lines assigned to the European Staff Sergeant should be abandoned, and other quarters be found for him in a more healthy locality.

Nagpore.

The lines of the Native Regiment having been so recently built, I do not advise their removal till further experience has been acquired, though it is much to be regretted that the site was ever selected.

279. In conclusion, I have to express my thanks to Brigadier General Fenwick, C. B., and to the Staff Officers of the Force for the aid given me in carrying out my inspection. To the Executive Engineer, I am particularly indebted for

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the elaborate plans prepared for me, some of which are on too large a scale for admission into a report of this nature, but which I have nevertheless used to illustrate portions of this report.

I would also reiterate that in the present transition state of the Cantonment of Kamptee, I have not thought it advisable to enter into so minute a description of public buildings, as I should have done had they been more recent structures of a permanent character.

In all that relates to general conservancy as carried out by the joint and harmonius working of the Military and Municipal bodies, Kamptee may be held up as a model Cantonment.

J. L. RANKING,
Sanitary Commissioner for Madras.

OFFICE OF SANITARY COMMISSIONER,
MADRAS, 23*rd February* 1869.

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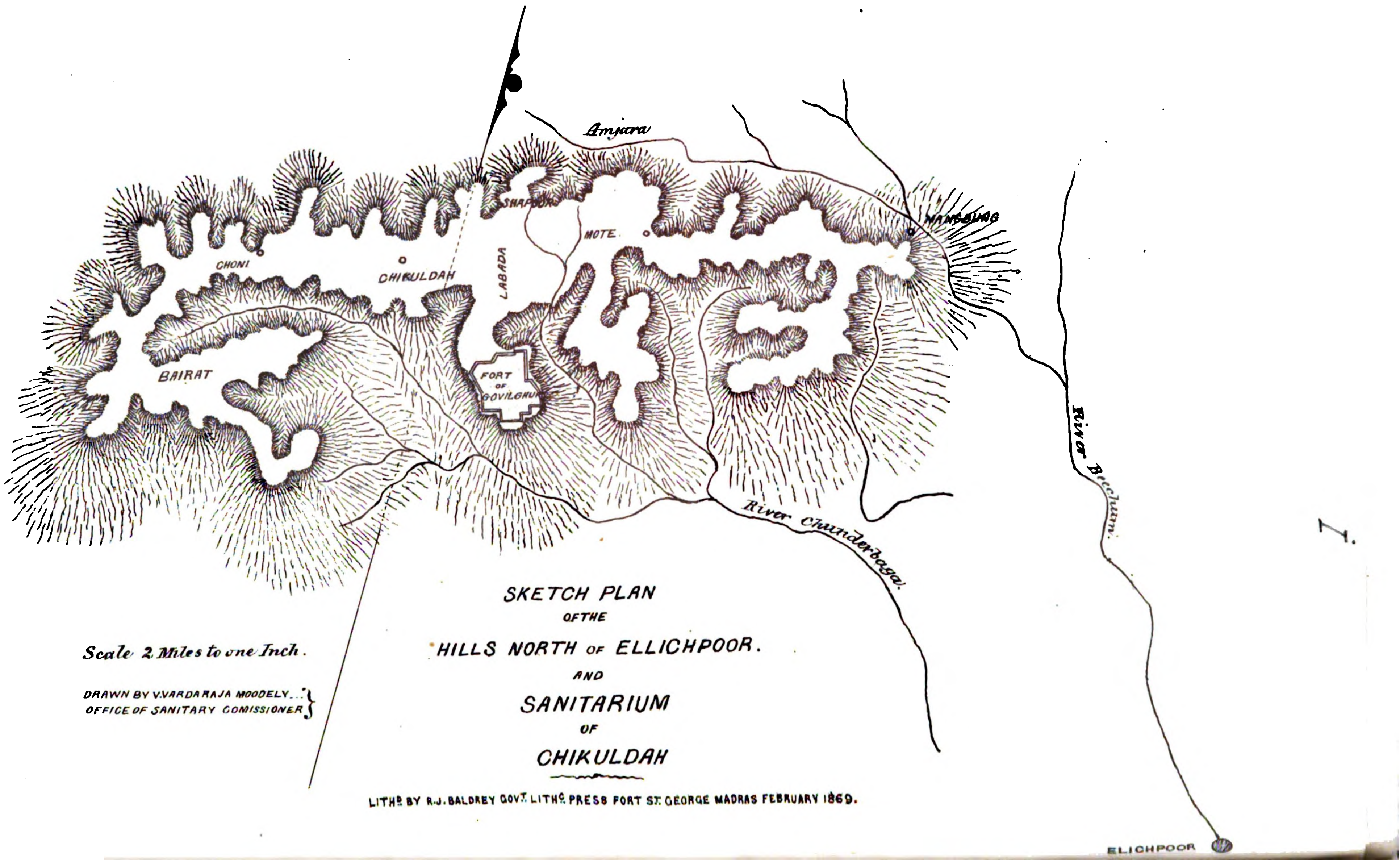
Amjara
MOTE.
LABADA
CHONI
CHIKULDAH
BAIRAT
FORT OF GOVILGHUR
River Beechum.
River Chunderbaga.
ELLICHPOOR
I.
SKETCH PLAN
OF THE
HILLS NORTH OF ELLICHPOOR.
AND
SANITARIUM
OF
CHIKULDAH
LITH.D BY R.J. BALDREY GOV.T LITH.C PRESS FORT ST. GEORGE MADRAS FEBRUARY 1869.
Scale 2 Miles to one Inch.
DRAWN BY V. VARDARAJA MOODELY... OFFICE OF SANITARY COMISSIONER

APPENDIX I.

CHICULDA AS A SANITARIUM.

[LETTER TO SECRETARY TO GOVERNMENT, MILITARY DEPARTMENT, FORT SAINT GEORGE, DATED 23RD FEBRUARY 1869.]

The selection of a Hill station, as a sanitarium for British Troops stationed at Kamptee, has, for some years, engaged the attention of Government, and after a trial of Moothoor, upon the Salthpoora range of mountains, Chindwarrah was fixed upon, and is now recognised as the sanitarium of the Central Provinces, under the Resolution of the Government, of the 14th September 1866, No. 3,226. Temporary Barracks and subsidiary accommodation for about seventy men have been built.

2. During my recent inspection of the station of Kamptee, the subject necessarily engaged my attention, and is referred to in the Report now in course of preparation for submission to Government; but as it will take some time to get that Report through the Press, I bring the subject to notice in this special manner, as it is desirable that the conclusions of Government should be arrived at before any steps are taken to replace the temporary buildings at Chindwarrah by permanent barracks, and which is, I understand, now under contemplation.

3. It was suggested to me by Brigadier General Fenwick, C. B., Commanding the Nagpore Force, that the hills to the north of Ellichpoor, which have for many years been resorted to by Officers of the Hyderabad Contingent, and which are known as the "Chiculda hills," possess superior advantages to the existing sanitarium of Chindwarrah, inasmuch as that they have (1) a greater altitude; (2) a more bracing and restorative climate; and (3) a greater facility of access.

4. Having made myself acquainted with the past history of the question of the selection of a hill sanitarium for the troops at Kamptee, and satisfied myself of the validity of the testimony borne to the superior salubrity and elegibility of the Chiculda hills, I determined to visit them, and have now the honor to submit a Report upon them for the consideration of Government.

I would remark *in limine* that I have formed a very favorable opinion of this range of hills, and consider myself quite justified in recommending that they be made the sanitarium for the troops at Kamptee, instead of Chindwarrah.

5. To enable the Government to judge of the validity of this opinion, it is necessary that I should sketch the leading characteristics of the stations of Moothoor, Chindwarrah, and Chiculda, touching briefly upon the grounds that led to the abandonment of Moothoor and the selection of Chindwarrah, the present sanitarium.

Moothoor,

6. Moothoor was first selected, and, in August 1860, a Committee was appointed to report upon it. The result was favorable, and the opinion was expressed that it would bear favorable comparison with Ramandroog.

The site chosen had an elevation of 3,400 feet above the sea, and is distant above 114 miles from Kamptee.

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By observations made by the Committee in a wattle-and-daub hut, with a thatched verandah, during a residence of twenty-two days, the maximum temperature recorded was 97°, the minimum 71°, the mean daily temperature from sun rise to sun set 87°, and from sun set to sun rise 78½°. The approximate mean daily temperature was found to be 83°; the mean daily range for the period was 16°.

Within the same period the temperature rose at Kamptee to 114½°, and the mean daily temperature in excess of that of Moothoor was 11½°.

In consequence of the favorable report made by the Committee, a party of men was sent up: but the experiment was not successful. A good deal of sickness occurred. This disastrous result is, however, attributed to the lateness of the season at which the party was sent, and the unsuitable accommodation provided for them.

Chindwarrah.

7. No further attempt was, however, made to establish a sanitarium there, and Chindwarrah was selected instead; for although it had not the altitude of Moothoor, it was known, being the Head Quarters of a Deputy Commissioner, to be a healthy place of residence, and moreover is nearer to Kamptee by 36 miles, a fact of much importance in a country where the roads are impracticable after the rains of the westerly monsoon.

8. This station has an altitude of 2,200 feet above the sea, or 1,200 feet less than Moothoor. The climate is described as "temperate and healthy." In the cold season the thermometer falls low, the average temperature being from 47° to 82° in the four cold months during the five years for which observations were recorded. Frosts are not uncommon, and ice is frequently seen in the small tanks at an elevation of 2,000 feet. Until May, the hot wind is said to be very little felt, but after that it becomes necessary to resort to tatties and other means of cooling dwellings, though the nights are described as invariably cool. The sanitarium is 78 miles from Kamptee. The communications are indifferent, though they have lately undergone improvement, but after the rains set in, the roads are more or less difficult, and may be pronounced to be impracticable for troops. "From Ramakona up to the limits of Chindwarrah to the south, is over a very difficult country—black cotton soil crossed and cut up incessantly by nullahs or water courses, with deep channels and muddy beds."*

Men selected to pass the hot weather at this (so called) sanitarium leave early in March, and return again before the rains, but some invalids are left over the rains, returning to Kamptee in October.

9. From enquiries I have made, this place does not come up in any way to the requirements of a sanitarium. The hot weather during which men reside there is certainly less trying than that experienced at Kamptee; but there is no bracing element in the climate. It is not restorative. Dr. Rennick, the Deputy Inspector General, assures me that when he had the supervision of European Troops, he inspected all parties of men before leaving Kamptee, and after their return, and that he could trace no indications of improvement, even when they remained over the rains, while he also testifies to the difficulties of access, and the hardships the men have to endure in rejoining Kamptee owing to the condition of the roads after the rains. Very similar testimony is borne by Dr. Sinclair, the Senior Medical Officer, British Troops.

* Gazetteer of Central Provinces, 1867.

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10. Chindwarrah doubtless as a place of *permanent* residence would be greatly superior for Europeans to Kamptee. Mr. Campbell, the Chief Commissioner of the Central Provinces, proposed in consequence to make it the station for British Troops; to abandon Kamptee in fact in its favor. He, however, made this suggestion conditional upon opening up the communications by extending the line of Railway. This proposition has been decidedly and decisively negatived by the Government of India.

11. Seeing then that Chindwarrah does not offer the advantages of a sanitarium in the true acceptation of the term, it remains to find a hill station which will meet the requirements, at the same time that it is within easy access.

The main requirements are, first, that the climate should not only offer those conditions that render a residence during the hot months something more than a mere escape from the high temperature of the plains, but that it should admit of residence all the year round by invalids who require a bracing and restorative air; second, that it should be within easy access so as to admit not only of invalids being sent up at any season of the year, but of convalescents being recalled at short notice in the event of their services being required at Kamptee; third, that it should be above fever range, and the approach to it free of that dense belt of jungle usually fringing hill ranges, in which fevers are so often contracted.

12. It has been advanced that with Wellington on the Neilgherries, no other sanitarium need be sought for, and as the available accommodation there is not half utilized, the search for other sanitaria has been discouraged. But men sent from Kamptee to Wellington are as much lost to the Nagpore Force as if they had gone home.

These considerations render it certainly very desirable that some hill station, provided it offers the conditions above assigned to sanitaria, should be looked for near at hand. These conditions, I think, are found in association with the hills to the north of Ellichpoor upon which the sanitarium of Chiculda is situated.

Chiculda.

13. This station is, I apprehend, but little known to the Government, although it has for many years been resorted to by Officers serving with the Hyderabad Contingent, and more recently by the officials of the Hyderabad Commission, who are desirous to obtain its recognition as the sanitarium for east and west Berar. There are at present some eight or nine houses, and other building sites are available, and should the Resident at the Court of His Highness the Nizam sanction its recognition as a sanitarium for the Commission, it will speedily grow into considerable importance.

The first description of the place is by Dr. Riddell, late Superintending Surgeon of the Hyderabad Contingent. It was subsequently reported upon by Dr. Mackenzie, the present head of the Madras Medical Department.

Dr. Boggs also brought its merits as a sanitarium to notice, and it is referred to by the late Inspector General Dr. Macpherson, in his reports upon Sanitaria. Captain Farrer, Assistant Commissioner at Ellichpoor, and formerly Resident Assistant Commissioner at Chiculda, (an appointment subsequently abolished, but which is to be again restored) also reported upon it in his "General Report upon Mailghat."

Lieutenant J. L. Mackenzie also touches upon its merits in the "Gazetteer of Mailghat" drawn up by him, a work which has not yet gone through the press.

Captain Farrer has favored me with such extracts from these several reports

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as bear upon the sanitary aspects of the question of selection of the station as a sanitarium, which will be found in the Addenda.

14. In perusing the extract given by Captain Farrer from Dr. Riddell's report, it is necessary to guard against a conclusion likely to be arrived at, that the plateau of Chiculda, by which name this sanitarium is known, is of very limited area. The fact is that Chiculda is only a portion of the plateau which extends for miles, and the more eligible sites of which for occupation are known by different names as the plateau of Chiculda, the table lands of Labada, Bierat, Mota, &c., &c. These plateaux communicate with each other by saddles of varying width, and along them roads have been already constructed. The Barracks, supposing the Government should determine to adopt this range as the sanitarium, could be located upon one or other of the plateau named above, except that of Chiculda itself, which is already occupied by the houses of Officers resorting to it during the hot season.

15. The extracts I give in the Addenda will suffice to put the Government in possession of the main sanitary features and advantages of this range of hills, but I may be expected to offer a few remarks grounded upon my personal inspection of them, and short residence thereon.

I visited the hills in company with Colonel Wyndham, Commanding at Ellichpoor, and Captain Farrer, and was very much struck with the beauty of the scenery, and the delightful elasticity and freshness of the air. The several plateaux are separated from each other by beautifully wooded dells converging to deeper ravines extending to the rich valleys below. Each plateau is also broken up into rounded hills or knolls, more or less wooded, the whole forming as beautiful a sylvan tract as the eye could desire to rest on. The climate, as so justly remarked by Dr. Mackenzie, reminded one of an European spring. My visit was in the month of January, and the three days I remained on the plateau I was out in the open air in warm clothing, all day long taking a great deal, of riding and walking exercise in exploring the whole plateau, without the least inconvenience or fatigue. The air was most balmy, but at the same time bracing; but warmer than usual at this season of the year, owing to the absence of the usual rains of the north-east monsoon. The thermometer stood at 58° (in the shade in a thatched verandah with a northern aspect) at 6 A. M., and never rose above 72° in the day.

I would refer to the extracts given in the Addenda for a further description of the physical features and climate of these hills, and would especially direct attention to the testimony borne by Dr. Mackenzie, C. B., C. S. I., as I know that it will carry great weight with the Government.

16. I desire to impress upon the Government that these hills have been long known and resorted to; that they are highly appreciated as a sanitarium by all who visit them; that the place is annually acquiring greater importance; that Native villages already exist on the plateau; that supplies are procurable, sufficient for the wants of the existing community; and that little doubt is entertained by the Assistant Commissioner that supply would keep pace with demand. Large herds of cattle find their pasturage on the plateau, and upon the northern slopes of the hills. The climate is most favorable to agriculture and horticulture; while competent authorities have pronounced that a Government farm, if established, promises to be a profitable speculation. Water is abundant at the

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plateau of Labada, and impounding reservoirs are capable of being constructed in other localities, while the numerous perennial springs only require to be opened out and conserved to furnish a further supply of pure drinking water.

17. The plateau in fact appears to offer advantages far superior to those of Chindwarrah not only as a sanitarium, but as a place of permanent residence, and affords abundant space for the location of an entire Regiment. Further, building material (stone) is obtainable in any quantity from the out-works of the old Fort of Gawilghur, which is about three-quarters of a mile from the plateau of Labada, and in communication with it by a good road.

18. In judging of the advantages of this plateau as a sanitarium, it is necessary that I should enter more at length upon some of the points noted, especially upon—

I.—Means of communication with Kamptee.
II.—Climate.
III.—Freedom from malarious fevers.
IV.—Water supply.

Communication with, and accessibility from, Kamptee.

19. Chiculda is 18 miles north of Ellichpoor, which is 36 miles from Budnaira, a station on the G. I. P. Railway. Budnaira is 107 miles or four hours from Nagpore. From Budnaira to Ellichpoor there is a made road, bridged, except over one river. This road was made as a "feeder" to the Railway, and the river alluded to is to be bridged. From Ellichpoor to the foot of the ghaut leading up to the Gawilghur fort (the out-works of which are passed on the way to the plateau of Chiculda) the road is a common country track; but wheeled conveyances can proceed 10 miles beyond Ellichpoor. Thence to the top of the ghaut (the ghaut itself is 4 miles in length) troops would have to march, and the sick be carried in doolies. At the time of my visit the ghaut was in bad order, but it is practicable for horses, bullocks, elephants, and camels. But immediately before the hot season commences, this road is each year put into repair, and workmen were employed upon the lower part of the ghaut at the time of my visit. Between Ellichpoor and the foot of the ghaut there are two nullahs to cross; but they do not constitute any real impediment. In the dry season when troops would resort to the hills, perfectly practicable roads can be made across them, and even in the rains they offer, I am assured, no real obstacles to the residents at Ellichpoor, who frequent the hills, going up and down, at all seasons of the year.

20. But in the event of this plateau being used as a sanitarium for British troops, it has been suggested that a new road should be made to the plains of Mota, the most eastern point of the plateau. This road has, in fact, been projected. Captain Farrer, Assistant Commissioner, informed me that it would be some 4 miles shorter than the road by Gawilghur, and the gradients would be sufficiently easy to admit of traffic by wheeled conveyances.

21. Troops then could leave Nagpore by the 7-45 A. M. train for Budnaira, and if they marched from thence, could make Ellichpoor in (say) three marches, and Chiculda in a fourth. If they proceeded by transit (and Brigadier General Fenwick, C.B., suggests the organization of a mule transit with the mules now at Kamptee) they could go in parties, through to Ellichpoor in one night, proceed

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to the foot of the ghaut, and march up early on the following morning; they could, in fact, reach the plateau the third morning after leaving Nagpore.

Climate.

22. The main features of the climate are so fully stated in the extract given from Dr. Mackenzie's report in the Addendum A that I need say no more than that it offers all the characters held to be desirable at sanitaria selected from amongst hill regions of moderate elevation.

The elevation of this plateau is such that while it offers a restorative and invigorating climate, even in the hotter months, it is below that altitude at which bowel complaints begin to become experienced, and above fever range. The elevation, in fact, is within the range that Sir Ranald Martin considers the best adapted to the European constitution within the tropics, whether suffering from diseases contracted within them or from debility resulting from a long residence in the plains.

Reference to the tables of temperature given by Dr. Mackenzie, if contrasted with that registered at Ellichpoor at the same hours during the three hottest months of the year, will show that the mean temperature of March is 12°·8 *lower* than that prevailing at Ellichpoor, of April 18°·9, and of May 14°·4, giving a mean for the three months of 15°·4. This simply expresses the difference between extreme discomfort and comparative enjoyment.

The hot winds of the plains are not experienced at Chiculda, while at Chindwarrah it is necessary to resort to wet tatties.

Table VI showing the calculated decrease of high day temperature in India, with an increase of height up to 9,000 feet above the level of the sea, for every month.

Months.	Height in feet. 4,000
January	11¼
February	11¾
March...	11½
April	18¾
May	15¼
June	18
July	17½
August...	14½
September	13¾
October...	14¼
November	12
December	11¾

The calculated or theoretical mean *annual* decrease of high day temperature for the elevation of Chiculda will, according to Mr. Glaisher, be about 13°·8. This will be seen by the marginal table taken from page 787 of the Report of the Royal Commissioners appointed to enquire into the Sanitary state of the Army in India. I have taken column 4 (altitude 4,000 feet) as sufficiently approximate to the altitude of this range, which varies from 3,777 (Chiculda plateau) to 3,980 (Bierat.)

23. But there is a character in the climate of the Chiculda hills as compared with Chindwarrah that has a very important bearing, viz., the comparatively small annual and diurnal range. The temperature of the hot season I have shown is considerably below that of Chindwarrah. During the cold season the extremes would appear to be much less, for while the *low night* temperature is higher (higher even than it often is on the plains at Kamptee and Ellichpoor), the *high day* temperature is very much lower. Frosts do not appear to be so common as they are at Chindwarrah, though they are not unknown in the villages at a somewhat lower elevation. The climate is in fact more equable, and this is a very important feature in the climate of these hills. The hot weather at Kamptee is even more trying than that at Ellichpoor; the thermometer not unfrequently, and for days together standing at 114° in the shade. The difference of range, therefore, between the thermometer at Kamptee and at

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Chiculda, during the hot months, would be represented by something greater than 15°. On the setting in of the rains, with the exception of a few days of heavy fog, the climate is described to be most enjoyable.

Freedom from malarious fevers.

24. My enquiries and observations upon the residents of the hills, justify my saying that the plateau is above fever range. Another fact of importance is, that the southern slopes of the range, and especially the route by which Troops reach the plateau, are not fringed with dense jungle, by a passage through which fevers are so often contracted. But fever is the prevailing disease not only of the villages upon the northern slopes of the hills, but of the whole of the valley of the Berar, and indeed of the Central Provinces. Mr. Campbell has remarked that fever is "the scourge" of these Provinces, and advanced this as an argument for removing the European Force from Kamptee to Chindwarrah.

25. In my report upon Kamptee now under preparation, I have shown the lamentable extent to which malarious fevers there prevail. I need in this place do no more than note in support of the fact, that in 1866, 562 per 1,000 of the European Troops passed through the hospitals for malarious fevers alone, and in 1867, 849 per mille.

26. A residence in these hills will, therefore, there is every reason to believe, insure immunity from these fevers so generally prevalent after the rains in the plains of Berar and Nagpore. Doubtless deadly fevers would be contracted at these seasons in the thickly wooded valleys of the southern slopes of the hills, but to these the soldiery would not have access.

It is possible also that fever may arise by malaria being wafted up the gorges, as has been observed at hill stations of even greater altitude than Chiculda; but this only illustrates the necessity of placing the Barracks at as great a distance as possible from such ravines or gorges.

Water supply.

27. Some of the extracts given from the reports upon these hills dwell upon the deficiency of the water supply, but since those days water has been impounded. A tank with an abundant supply, and capable, by raising and consolidating the bund, of very considerable increase, has been made between the plateaux of Labada and Chiculda. The large reservoirs existing within the Fort of Gawilghur sufficiently indicate the possibility of extending these impounding reservoirs. Numerous perennial springs also exist within a very few feet of the plateau at the heads of the numerous ravines stretching towards the valleys. Indeed, I am justified in saying that no apprehension need be entertained about a sufficiency of water.

28. There are many other points I might touch upon, but that I think it better to leave them to be dealt with by more competent authority, such as the development of the trade of the hills and of the rich valleys between them, which would result from establishing a large sanitarium upon these hills, a project which I have reason to believe is engaging the attention of the Commissioners of Berar, and which if carried out would of course lead to improvement of the means of communication and possibly to the formation of the new projected road to the plateau of Mota.

29. I do not at this stage indicate the particular part of the plateau, upon which the Military sanitarium should be established. I am merely desirous to

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raise the general question of the desirability of making the Chiculda hills the sanitarium for Kamptee instead of Chindwarrah upon the grounds already advanced, viz.:—

First. That they have an elevation of 1,500 feet above that of Chindwarrah, and consequently a residence upon them during the hot weather will constitute something more than simple escape from the heat of the plains, while the climate at other seasons of the year is well calculated to restore vigor to the European constitution.

Second. That they are more easy of access, and that consequently convalescents could be recalled if their services were required; the men in fact would not be so lost to the Nagpore Force as they are at Chindwarrah or at Wellington.

30. I do not, however, by the latter remark intend to imply that no men should be sent to Wellington. There are many cases in which such grave inroads have been made upon health, that transfer to the more bracing climate of the Neilgherry Hills, may become necessary. But a large number of the men now sent to Chindwarrah (which in point of fact is utilized more as a relief to the Barrack accommodation at Kamptee, than as a sanitarium) would derive far greater benefit from a residence at Chiculda; while the number of cases requiring transfer to Wellington, or to England as invalids, would be reduced.

31. What I would inculcate is the desirability of utilizing Chiculda by sending there a body of men, who, by reason of their youth, or from natural delicacy of constitution, or impaired health by long residence in India, are likely to derive benefit by location there from the commencement of the hot to the close of the rainy season, when they would re-join Head Quarters; to be followed, at the commencement of the next hot season by another selected body. In properly selected cases it is possible that residence also through the cold season might save many from being invalided to England; and when the proportion which invaliding is now assuming in India, and especially at the station of Kamptee, is considered, it must be, I think, admitted that in a financial and economic point of view, the suggestion is worthy of every consideration.

I may also note that the temporary accommodation at Chindwarrah must soon be re-constructed, so that the present is a favorable time to determine whether such accommodation shall be provided at Chiculda or at Chindwarrah.

32. Plans of the principal plateaux upon this range of hills, including that of Chiculda, is appended to this report.

J. L. RANKING,

Sanitary Commissioner, for Madras.

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ADDENDUM A.

Extract from a General Report upon Mailghat by Captain A. Farrer, Assistant Commissioner, East Berar, in 1866.

SECTION II.—DIVISIONS.

TOPOGRAPHY.

* * * *

Chiculda and its vicinity.

33. The beautiful plateau of Chiculda from its increasing importance as a sanitarium demands particular notice. The plateau upon which the bungalows are built, is 3,777 feet above the sea, and 182 feet higher than Gawilghur, distant to the south-west about twelve furlongs. Between, lies the village of Labada, where in 1803, Colonel Stevenson planted his batteries after his laborious march through the hills from Ellichpore, by way of Dhamingaom, Silona, and Amjeera.

On an elevated piece of ground behind the site of this village is a tablet, sacred to the memory of Lieutenant Young of the 2nd Battalion of the 7th Fusiliers, who was the only Officer who was killed in the assault on the fort.

West of Chiculda, the table land rises very gradually for about 5 miles, till it reaches the highest point of all Bairat, which is 210 feet higher than Chiculda. There is really not much more than an hundred feet difference in the actual altitude of the two plateaux, the superior elevation of Bairat, being chiefly attributable to a small conical hill rising out of the otherwise level surface of the plateau.

Communication with Ellichpore.

Chiculda is distant from Ellichpore about 18 miles by the usual road, which winds up the western side of the Gawilghur hill. The ascent is generally easy, but there are some rather steep portions: it can be ridden the whole way on horseback. Supplies and baggage have to be brought up on bullocks or camels. A new road, viâ Mota, is projected, which it is to be hoped will be practicable for wheel conveyances, and thus bring this sanitarium within easier communication with Ellichpore, and the other outlying stations of Berar and the Central Provinces.

* * * *

Climate and natural features.

35. The climate and natural features of this sanitarium and its vicinity have been from time to time so well described by scientific men, that I cannot do better than reproduce some of their opinions on the subject.

" The plateau of Chiculda," says Dr. Riddell, late Superintending Surgeon at Hyderabad, "is not above three-quarters of a mile broad, and about a mile " in length; but though thus limited in size, it has easy access to the surrounding " table land and valleys, that renders its contracted space of little moment. The " form of the plateau in outline, when viewed from the west, bears a fanciful resem- " blance to a map of the British Isles. The cool breeze which prevails at the " sanitarium during the hot months is a proof, that the elevation must be consi- " derable, and many invalids can bear testimony to the sudden relief they have

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"experienced there from the suffocating heat usual at Ellichpore during the hot "months. Ladies and children in particular seem to derive much benefit from "the place. The varied and extensive scenery commanded from this elevated "spot is both graceful and romantic, exhilarating the mind by the grandeur of its "precipitous ravines with their bluff fronts and bold projections. The more "gentle scenery of a vast sylvan tract is seen trending away towards the north "covered with high grass, and forest trees, in a series of undulating steppés, all "connected one with another, and diminshing in altitude as they recede, em- "bosomed amidst which, are lying innumerable verdant and secluded valleys. "Good roads have been made along the irregular plateau commanding "fine views of the neighbouring most picturesque country, and giving every "facility for taking air and exercise without the fatigue of wandering in the "jungle, or descending into the deep ravines near which the roads pass.

"As the slope of the mountains inclines towards the north, a more pleas- "ing character presents itself in this direction, than towards the south where "the face of the mountain stands denuded, as a bold, precipitous, and cliff- "like barrier, admitting only at intervals of winding pathways, steep and diffi- "cult of ascent up its craggy front. It was through some of these passes that "the first Moslems penetrated into the Deccan, led by the enterprising but "murderous Alla-u-deen of the house of Khilge. Upon the south the whole "valley of Berar is seen spread out beneath the gazer's feet: during the hot "months it is generally shrouded in a sullen looking mist, which seems to hang "oppressively over the valley; but when the air is clear and bright, as at other "periods of the year, the extensive campaign of Berar is seen across its entire "breadth, and sometimes far beyond—the hill fort of Mahore being at times very "distinctly visible."

* * *

Extracts from Dr. Mackenzie's Report.

36. Dr. Mackenzie, late of the Hyderabad Contingent, writes thus in 1842: "The following tables, exhibiting the mean range of the ther- "mometer for the seasons 1840 and 1841, will convey a much "better idea of the climate during the hot weather, than "any general statements I can give on the subject.

THERMOMETRICAL OBSERVATIONS.

1840.	6 o'clock A. M.	11 o'clock A. M.	Sunset.
March	74° 41′	78° 17′	79° 37′
April	79° 41′	84° 5′	87° 0′
May	79° 21′	84° 56′	85° 10′
1841.	**6 o'clock A. M.**	**11 o'clock A. M.**	**Sunset.**
March	69° 10′	71° 8′	75° 0′
April	73° 30′	75° 20′	81° 8′
May	78° 4′	82° 9′	83° 0′

"These tables, when contrasted with the following for the same season in "Cantonments, will at once shew the striking superiority of this climate over "that of the valley during hot months.

	6 o'clock A. M.	11 o'clock A. M.	Sunset.
March	82° 22′	88° 0′	84° 30′
April	88° 36′	101° 40′	97° 26′
May	90° 23′	100° 32′	97° 21′

"Although the temperature of the hills, as exhibited from the former

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"tables, is exceedingly mild, yet it was a general observation that the thermo-
"meter indicated higher than one would infer from his own personal feelings.

Observations on the seasons.

"The morning air throughout the whole season is delightfully elastic and "invigorating, and walking exercise was the favourite amuse- "ment at that time of the day with the ladies, who seemed to "suffer no inconvenience from remaining in the open air till "8 o'clock; a light gentle breeze continues to blow during the day, and the "nights are really so cool that, generally speaking, a sheet is by no means an un- "pleasant covering in the month of May.

"April is considered the most unpleasant month; the atmosphere becoming "occasionally close and sultry about midday, but, towards the afternoon, large "clouds regularly form, which fall in showers, restoring the temperature to its "usual mildness. At the commencement of the rains about the 8th or 10th "of June, thick fogs set in, which render the place very gloomy and disagreeable, "but after a heavy fall of rain, they completely disappear, and the climate is "then said to be very delightful.

"From September, the temperature is so equable, cool, and bracing, that, "without any exaggeration, it may be styled a European spring. On the 26th "of January 1840, the thermometer suspended in the open air under a tree "stood at noon at 62 degrees.

Chiculda as a sanitarium.

"As a convalescent station and therapeutical agent in the treatment of "disease, it has already been found of the greatest advantage "in the cases of three Officers in this station, who suffered "from fever, hepatitis and rheumatism, and I am sure I do "not exaggerate the mildness of the climate, when I express my conviction, "that with substantial bungalows, having glass doors and windows, to render it "agreeably habitable in the rainy season, it will be found of incalculable benefit "to people residing at Ellichpore, and may, perhaps, ere long, be the happy "means of preventing the necessity of their resorting to expensive journeys "elsewhere for change of air. From experience of two seasons of its bracing "effect on the constitution of children, I can speak of it only in terms of the "most unqualified praise, and I feel persuaded that by withdrawing them from "the excessive heat of the valley in the hot season, the temperate atmosphere "of this climate will be found to exert a most beneficial influence in warding "off many of the acute attacks incident to childhood, and more especially to the "period of dentition.

Supply of water

"Unfortunately the supply of water for culinary purposes is very scanty, but "what is to be had is good and procurable from two small "wells, within a mile of the station: and for drinking from "several natural springs in the ravines close to our bungalows.

General salubrity of these hills.

"No where is there the slightest appearance of a swamp or marsh, nor is there "any epidemic disease peculiar to the hills, and their salubrity "is established by the fact that with the exception of two "severe visitations of cholera, accompanied, or rather preced- "ed, by famine in the years 1834 and 1838, out of a popula- "tion of upwards of 3,000 inhabitants, there have been only forty deaths for the "last ten years, and were they not extremely addicted to drunkenness, I have no "doubt the mortality would be a good deal less.

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" The people of Nagpore may take advantage of this station, which presents a change of air at a moderate distance."

In a report by Dr. Boggs in 1860, on the hill of Chiculda, or rather on that portion of the Sathpoora ranges extending from Gawilghur on the east to Bairat on the west, with the hill of Chiculda between, comprising a surface of about seven and half miles, the following general remarks occur:—

General remarks on their advantage as a sanitarium by Dr. Boggs.

" It appears to me that Chiculda only requires to be better known, and it " will at once be established, not only as the sanitarium of the Deccan, but I " have reason to hope it will ere long share the popularity which other hill sani- " taria of greater elevation enjoy as a retreat from the plains, and from its " central position, and the facilities which will be afforded by Railways, be more " resorted to, than it hitherto has been, from the surrounding stations.

" As a convalescent station and therapeutic agent in the treatment of " disease, Chiculda, moreover, possesses one advantage over other sanitaria, and " which is one of some consideration, namely, that its residents, as suggested by " Dr. Martin, as an established principle, will not be so liable to the diseases so " peculiar to mountain stations of a higher range. The experiences of the Hima- " laya positions, (says the learned Doctor,) of those of the Neilgherry mountains, " and of those of Ceylon, as sanitary stations, prove, that by residence on their " respective elevation, the European is removed greatly above the range of the " malarious fevers of India. But while this great and valuable fact is admitted, " it is undoubtedly true, that he is in too many instances carried into the range " of another class of diseases, namely, that of bowel complaint.

Drawbacks.

" There is, however, one circumstance which, I believe, has hitherto operated " as a serious drawback from the otherwise great advantages " to be derived by a resort to these hills, and that is, those " who come upon only for the hot weather, have to return to " their respective stations in the rains, which, as has been seen, set in here " about the middle of June, thereby involving not only considerable trouble and " expense, but the season is then, as it is throughout the country, so notoriously " unhealthy, as to render travelling anything but safe and pleasant, and more " especially through the malarious districts of the Berar valley.

" But those who can, will do well to remain up on the hills until about the " end of December, by which time they will have had the full benefit of a salu- " brious and bracing climate, and marching then, instead of being tedious, " would be pleasant and enjoyable, and in the case of invalids, would conduce " more to the completion of their recovery. They will be less liable to relapses, " and their systems being previously fortified, would be more capable of resist- " ing the pernicious influence of climatic changes. In support of this theory, I " beg again to quote Dr. Martin's opinion, as thus expressed."

" Another disadvantage of the hill stations hitherto occupied by us in the " East Indies, was noticed by me, when serving in Bengal, namely, that while the " hill climates are permanently serviceable against the malarious fevers of the " country, their influence in conducing to the cure of these, or other diseases, is " limited in extent, the soldier being troubled with relapses of his disorders on " descending into the plains, unless kept on the hills for a long time.

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"From the foregoing observations, it may be inferred, that the Chiculda "hills would be admirably suited for a sanitarium, and if the "establishment of a convalescent depot for European sol- "diers be determined on, I would beg to recommend, that "of the several plateaux composing this extensive table "land, the hill of Labada be the site selected, it being in every respect adapted "for such an institution. The contracted area of Chiculda will not admit of "any extensive buildings. Bairat is with difficulty accessible, and the Fort of "Gawilghur, to which, though the fogs in it are said to be less dense, there are "many drawbacks to its location as a convalescent depôt; there is no level "ground in it, of any extent, to admit of recreation or exercise, and there is a "closeness about the air in it, which does not obtain at any of the other places.

Labada recommended as a convalscent Depot for Troops.

"Labada, on the other hand, is a more open and extensive plateau, and it "moreover contains a large tank, fed by numerous springs, "and from which the whole station is supplied with water. "There is abundance of stone and other building material "in the Fort, which might be made available for good sized Barracks."

Remarks on Labada.

"Before concluding these remarks, I must not omit to notice, one other "desideratum, which has hitherto operated as a great draw- "back to the occupation of this station by Europeans, "namely, there is no regular bazaar, and the supplies have to "be brought up from Ellichpore, but these inconveniences will not exist, when "the place becomes established as a permanent settlement for Europeans."

Want of regular Bazaar.

The rainfall at Chiculda is generally supposed to be about 36 inches, but this, I think, is very much below the mark. Next year, however, I hope to have the rain regularly gauged, when I shall be able to speak with more certainty on this point.

Rainfall.

I hope this season, to induce the Gonds to bring their grain and fowls, and to establish a weekly bazaar in the vicinity of Chiculda, which will perhaps tend to obviate the inconveniences hitherto experienced, by having to bring up all sorts of supplies from Ellichpore. The Gonds, no doubt, if protected from ill-treatment, and anything like forcing of prices on the part of servants and Jowans, will see their own interest in this arrangement and willingly continue it.

Plan for establishing a weekly Bazaar.

The new tank which is projected immediately under the plateau, will be an immense boon to the sanitarium when it is completed. One or two good wells are, however, urgently required, I think, for drinking water; the supply of which, from the present springs in the summer month, is very limited.

The new Tank projected.

All the preceding remarks, relating to the climate of Chiculda and its vicinity, may be said to apply, with greater or less force, to the entire chain of plateaux, which crown the summits of these hills. Owing to the salubrity of the climate in the higher ranges—the abundance of pasturage and the suitability of the soil on the sheltered slopes in the northern aspect for the cultivation of coffee, and very probably tea, chinchona, and other valuable crops of this kind—these plateaux would appear to be admirably fitted for European colonization,

Foregoing remarks apply with more or less force to the whole of the elevated plateau along the range.

Plateau suitable for European colonization.

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Question of water supply.

Connected with this, the supply of water is of course a most important question: the complaint all along the upper range, and the cause of nearly all the villages in this direction being deserted, is the absence of water during the dry season. It is quite certain that, without artificial means, a permanent supply of water can never be looked for; that artificial means, however, will, if well directed, secure that desirable object seems most probable. To assure ourselves of this, we have only to turn to the wells and tanks in Labada and Gawilghur. If water can be thus obtained in those places by artificial means, there seems to be *prima facie*, no reason to doubt that it could be obtained in the same manner all along the summits. Indeed, I have myself observed, in many places, natural springs which only require to be opened out and deepened; and the undulating surface of the plateau seems in places peculiarly fitted for forming bunds.

Suitability of higher ranges for growing coffee.

A gentleman, who has been in Australia, and has had considerable experience in sheep farms in New Zealand, and coffee planting in Wynaad, has lately been paying a visit to this place. He is of opinion that these ranges are well suited for sheep and cattle farms; and from the appearance of the coffee plants growing on Mr. Mulheran's estate in Chiculda, he considers that coffee can be cultivated successfully, provided the Planter can command a sufficient amount of labor in the picking season.

ADDENDUM B.

Extract from the Gazetteer of Mailghat drawn up by Lieutenant K. J. L. Mackenzie, Assistant Commissioner in 1868.

* * * *

Climate.

Two distinct climates are to be found in Mailghat, according as we keep to its higher ridges, or descend into its lower valleys. The former healthy and invigorating, as evidenced at Chiculda the sanitarium of this part of India, the latter unhealthy and enervating.

Thermometer readings at Chiculda.

The mean of the thermometer readings at Chiculda, for each month of the year, has been as below:—

January	69·7	...	July	70·5	64
February	74·6	...	August...	70·8	66
March	78·3	...	September	71·5	65
April...	91·3	76·87	October...	76·	...
May	92·1	74·3	November	70·	...
June	77·2	...	December	67·3	...

Rainfall at Chiculda.

The average of the rainfall, as gauged at Chiculda for the past two years (1866-67) before which time no register was kept, has been 60·22 inches. The total rainfall in season of 1866, a bad one, was only 39·64 inches, while this year it has amounted to 50·31 inches.

The rainy season lasts from the beginning of June to the middle and end of September. Heavy showers also fall in February and March, while April generally

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sees at least one severe hailstorm. Thus, while the higher ridges are comparatively healthy all the year round, exposure to the rains and night dew of course being avoided, a most deadly fever is contracted in the valleys between the close of the rains and the end of December, the time when the rank vegetation, after attaining maturity, begins to rot away under the combined influence of the sun by day and the dew at night. Diseases of the spleen and a kind of goitre is known among those who long reside in certain parts of the valleys. Cholera too, occasionally makes an inroad with more or less severity, while small-pox is most virulent in its ravages amongst the younger children.

(True Extracts.)

HOWARD B. MONTGOMERY, M. D.,
Secretary Sanitary Commissioner
for Madras.

APPENDIX II.

REPORT ON THE SITES PROPOSED FOR THE NEW HORSE AND FIELD ARTILLERY BARRACKS AT KAMPTEE.

In compliance with Order of the Madras Government, No. 4,903, dated 17th December 1858, (Military Department), the following Report was prepared. His Excellency the Commander-in-Chief, Madras, had previously expressed his assent to the adoption of the proposals of the Kamptee Committee contained in the following letter referred to by the Government of India for any remarks desired by the Government of Madras.

From the Secretary to Chief Commissioner, Public Works Department, Central Provinces, to the Secretary to Government of India, Public Works Department; dated Nagpore, 7th October 1868, Nos. 337-4054.

The Government of India having finally settled that the new barracks for the Artillery shall be erected at Kamptee and not at Chindwarrah, as had been proposed by the late Chief Commissioner Mr. G. Campbell, a Committee assembled on the 17th September last to fix on the best site for the new Buildings, and I am now desired to submit the Proceedings.

2. It was deemed advisable at first to deal with the Artillery buildings only; but, in so doing, to bear in mind that the Infantry would have also to be provided for, and that ground must be husbanded for that purpose.

3. There was a strong feeling on the part of the Committee that the barracks should occupy the ridge generally known as 'Blogg's Drive,' and which had previously been selected as the site for the Ordnance Depôt.

Such an arrangement would, however, have resulted virtually in separating the men and Officers, and in dividing Kamptee into two parts, as it was hardly to be expected that the owners of dwelling houses would remove them in the direction of the new buildings.

This did not escape the observation of His Excellency Sir W. Mansfield when inspecting the ridge in question, who objected to it on the above grounds, and it was subsequently considered by the Committee as fatal to the occupation of 'Blogg's ridge.'

In the immediate vicinity of the present Artillery barracks, ground was selected for the Field Battery lines, and along-side, but a little thrown back, ground for the Horse Artillery barracks was marked out (see plan, in which these new buildings are marked blue.) This arrangement was very

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compact, but it was thought that the Horse Artillery lines were thrown into somewhat low ground where damp might lie, and a better site was found towards the S. W. (see site marked yellow in plan), The aspect of the barracks, as plotted on the sketch map, is one point (11° 15′) to south of west.

The Chief Commissioner has examined the ground, and can confirm all that has been urged by the Committee. He recommends the blue site for the Field Battery, and the yellow for the Horse Artillery. He also urges strongly the removal of the cattle sheds and bazaars on the right flank to a less objectionable place, and Mr. Morris trusts that these proposals will meet with the approval of His Excellency in Council.

I am to add that the plans and estimates only await the approval of the site. They cannot be completed in anticipation, as the depth of the foundations at Kamptee vary from 4 to 26 feet, and may cause great fluctuations in the cost.

Proceedings of a Committee assembled at Kamptee on the 17th September 1868, by order of Colonel W. F. Patterson, Commanding Nagpore Force, to fix sites for the barracks of one Horse and one Light Field Battery of Artillery,

President,

Colonel W. F. Patterson, Commanding Nagpore Force,

Members,

Surgeon Sinclair, Senior Medical Officer, B. Troop,
F. J. Johnstone, Esq., Executive Engineer, K. D,
Lieutenant D. Dinwiddie, Barrack Master.

Read note of the Chief Engineer, Central Provinces, dated Nagpore, 1st August 1868.

The Committee having carefully inspected the ground to the southward of the present British Infantry and Artillery barracks, and the existing sites of those barracks, observe that the ridge or rising ground extending along the eastern part of which is the road known as 'Blogg's Drive' is abstractedly the best site in the immediate neighbourhood of the Artillery and Infantry end of the Cantonment, as being the most elevated, and as having a clear open space for some miles in the direction of the prevailing winds,

The soil is not unobjectionable, but perhaps not altogether unfit for building purposes.

To place the Artillery and British Infantry of the Force lower on this ground, indicated on the accompanying sketch by F. J. Johnstone, Esq., would amount to an abandonment of the existing Cantonment, as regards the two arms named, together with the Officers' houses, some not inconsiderable public buildings, and would entail a considerable outlay for new roads.

It would also remove these troops to an inconvenient distance from their existing hospitals, and leave them under that inconvenience until new hospitals were constructed, if such be in contemplation.

The sites 1 and 2 on the sketch, on which are traced block plans of barracks for a Horse Battery and a Light Field Battery are respectively about 23 feet and 30 feet lower than the ridge above-mentioned, but the upper stories of barracks on the standard plan here situated would get the breeze from south-westward. They would, to a great extent, allow the new buildings to be executed without interfering with the existing ones, or with the Officers' houses, and seem to be unobjectionable, provided that the whole of the Commissariat cattle sheds and the bazaar, which exist in their neighbourhood, which are to windward of the sites be quite removed,

The Committee are strongly of opinion that this removal is a '*Sine qua non*' for the healthiness of the Artillery barracks. The cattle sheds and bazaars are further objectionable in their present situations, because their drainage is into the Koolar river, just above its junction with the Kanhan, which, after that junction, flows past the whole of the Kamptee Cantonment.

A convenient site for the cattle has been examined and recommended to the south-east of the Cavalry Lines.

The Committee recommend the adoption of the Chief Engineer's proposals regarding distribution and aspect of the new buildings, as set forth in paragraphs 6, 7, 8, and 9 of his note of 1st August 1868.

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The following is the reply of the Sanitary Commissioner for Madras:—

[LETTER TO THE SECRETARY TO GOVERNMENT, MILITARY DEPARTMENT, FORT SAINT GEORGE, DATED 7TH JANUARY 1869.]

ENCLOSURES 2.

1. Tracing showing the original and the Superintending Engineer's alternative plan for the Battery of Horse Artillery.
2. Plan (returned) with Superintending Engineer's alternative plan for Field Battery, site marked A.

1. I have the honor to acknowledge the receipt of Proceedings of Government, in the Military Department, and Order thereon, No. 4,903, of 17th December 1868, directing me to report upon the sites proposed for the new Horse and Field Artillery Barracks at this station.

2. The question of the disposition of these Barracks is to be considered in connection with that of the fresh location of the British Infantry, who will sooner or later be also provided with new barrack accommodation.

3. The Committee, of which Colonel Patterson was President, remarked that abstractedly the high ground known as 'Blogg's Drive' is the best site in the immediate neighbourhood, as being the most elevated, and having a clear open space for some miles in the direction of the prevailing winds, but considered that this position was objectionable as its occupation would amount to an abandonment of the existing Cantonment, together with the Officer's houses, and some not inconsiderable public buildings; would entail a considerable outlay for new roads, and would remove the troops to an inconvenient distance from their Hospitals until new Hospitals be constructed.

Proceedings of Madras Government, Military Department, No. 3,236, dated 14th September 1866.
Memorandum by His Excellency the Commander-in Chief in India on Military works at Nagpore and Kamptee, dated 12th December 1867.
Minute by Chief Commissioner, Central Provinces, on provision of new Barracks for the Kamptee Force, and for the location of Troops at Chindwarrah, dated 28th March 1868.
Proceedings of the Government of India, Military Department, No. 79, dated Simla, 4th July 1868.

4. Prior to the receipt of the Proceedings under reply, I had made myself fully acquainted with the whole aspect of the question of the fresh location of British Troops as conveyed in the documents noted in the margin, which had been courteously placed at my disposal by the Secretary to the Chief Commissioner in the Department of Public Works for this Province.

5. After a careful study of the features of the Cantonment, and especially of that portion occupied by British Troops, I arrived at the conclusion that it is highly unadvisable on sanitary grounds to redispose the Barracks upon the sites at present occupied by the Artillery and Infantry.

My reasons for arriving at this conclusion will be given more *in extenso* in my Report upon the station, now under preparation, which will in due course be submitted to Government.

6. I may here observe that the physical conditions of the surface and soil, and topographical position of the Cantonment sufficiently account for the prevalence of fever so rife at the station, and that the Lines of British Troops occupy the worst position of all. They are in close proximity to low tracts of land which become swampy in the rains, and which have not up to the present period been drained; though the Executive Engineer has submitted a scheme for draining them.

7. On the other hand, the ridge known as 'Blogg's Drive,' besides the advantages noted by Colonel Patterson's Committee, is above the 'fog level,' a circumstance that should always be taken into consideration in the selection of sites for location of Troops. When the Cantonment lies enveloped in fog 'Blogg's

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Drive' is free from it, and the purity and freshness of the atmosphere there, as compared with that in Cantonment, is most marked.

8. I further question whether they will be space for the redisposition of the barracks without that undue crowding together of the different buildings that has been commented upon by Sir W. Mansfield as an objectionable feature in the present sanitary condition of the lines, or whether it will be possible to arrange the barracks so as to place them to windward of their out-houses without bringing them too close to low swampy ground.

9. I would also direct attention to the fact that in the proposed re-arrangement or fresh location of the Artillery Barracks most objectionable ground must be taken up. In the case, both of the Horse and Field Artillery, it will be seen by the plan, that the old 'Horse Lines' are to be built upon, and in the case of the Horse Artillery (the site marked yellow in the plan) a portion of the Grass-cutters' Lines and Artillery Bazaar will also be taken up.

10. I earnestly deprecate ground of this nature being built upon. The soil of the Horse Lines is saturated with urine and other organic matter, and the ground hitherto occupied by Native villages or bazaars, is also more or less foul.

11. The Superintending Engineer, Mr. Armstrong, foreseeing this objection, has suggested an alternative arrangement of the buildings. This was recently submitted for approval, and, as it is not shown upon the 'plan' transmitted with the Proceedings of Government, I append a tracing upon a larger scale, prepared for me by the Superintending Engineer. By this arrangement, Mr. Armstrong avoids placing any barrack upon any portion of the Horse Lines; but even under this arrangement, I would urge that the locality is in a sanitary point of view objectionable, and advocate the entire removal of the British Force to 'Blogg's Drive.'

12. I am authorized to say that the Superintending Engineer unhesitatingly gives the preference to this site; but that, if it be rejected, he would advocate the abandonment of the site marked for the Field Battery which he would locate on higher ground to the north-west of the Horse Artillery (on the site colored black) beyond the Magazine, on the ground occupied by the Commissariat Stores, a position which has advantages over that at present proposed.

13. I will now dwell for a moment upon the objections that have been raised to the site of 'Blogg's Drive.'

The first objection urged is, that its selection will virtually be an abandonment of the old Cantonment, and that it will be too far from the Officers' houses.

14. The site is not so far removed from the existing Cantonment. as the new Race Course Barracks at Bangalore are from the houses occupied by the Officers.

General Fenwick does not consider that the distance would be of material inconvenience, especially if quarters for the Staff Officers were built at the new site. He further considers that the family quarters might remain where they are, as they would not be at too great a distance, especially if the Parade grounds were formed upon the eastern slope of the ridge between it and the present Canment. It must be remembered, however, before admitting the possibility of

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retaining the present family quarters, that the aspect of many of them is faulty, and that they are somewhat crowded together.

15. This is a Military question, however, perhaps beyond my province; but if it can be made to fit in with sanitary considerations, 'Blogg's Drive' must be selected. I would, indeed, go further and say, that even if it be necessary to provide quarters for the whole of the Officers, preference should be given to this site.

16. The abandonment of public buildings will entail a sacrifice, the magnitude of which I do not overlook; but a most competent authority,—His Excellency Sir William Mansfield himself,—has upon this point placed upon record the opinion that "the property held by Government in public buildings at Kamptee is of no moment, and need not be taken into account." Sir W. Mansfield's views are apparently accepted, as in the proposition under reference, all existing buildings will be abandoned and new auxiliary and subsidiary accommodation of all kinds be provided.

17. The cost of provision of new roads, if 'Bloggs' Drive' be selected, will be met by the saving of the expense incurred in compensation for the removal of the bazaars near the cattle lines, and of the public buildings in connection with them; which removal is made a '*sine qua non*' by Colonel Patterson's Committee (and with this opinion I entirely coincide) if the new barracks are to be upon the sites at present proposed. If 'Blogg's Drive' be selected, the cattle lines need not be removed, as they will be at a distance from, and to leeward of, the new Cantonment.

18. The distance from existing Hospitals does not constitute a real objection, and for the reason, that the hospitals are as bad as the Barracks—worse indeed as hospitals than the barracks are, as barracks—and will equally with them have to be re-constructed; and if 'Blogg's Drive' be selected, would, of course, be built there in convenient locality to the different arms of the Force.

19. I may also advance an objection to the erection of new barracks upon the proposed sites. It will entail the congregation of large bodies of workmen who, unless kept under very strict sanitary regulations—and it is difficult to bring this class of people under efficient control,—will soil the surface while in themselves they will be a source of danger in the way of communicating epidemic or contagious diseases to the Troops. The ground also will be strewed and littered with building materials, and the *debris* of old buildings removed, for a long time, even after the Troops occupy the new barracks.

By selecting 'Blogg's Drive,' all this will be avoided. The erection of Barracks, Hospitals, and all Subsidiary buildings can progress *pari passu*, and when all are quite ready, the troops can be moved in. The workmen employed will also be at a safe distance.

Recapitulation.

20. The opinion I have expressed may be thus briefly recapitulated. If it be determined that a site near to the present position occupied by the Artillery should be selected, I give the preference, in the case of the Horse Artillery, to Mr. Armstrong's alternative plan, by which the old Horse lines will be avoided. In the instance of the Field Battery, another site than the Horse lines must be selected for the position of Barracks and family quarters, and that suggested by the Superintending Engineer referred to in paragraph 12 is the best.

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I would, however, strongly and earnestly advocate the removal of the whole European Force to the elevated position known as 'Blogg's Drive,' which, besides the advantage of elevation, possesses the recommendation of being new ground, more removed from the river bank, of being to windward of the low-land lying between the 'Drive,' and the old Cantonment; of being capable of efficient drainage, and of being above the 'fog level.' The only point for determination before a final decision be passed, is the capability of obtaining a sufficient water supply. On this point, however, I am assured by the Superintending Engineer there need be no apprehension. It may be necessary to sink the wells deep, but water will be obtained, and in sufficient abundance.

I may also add that Major Fischer, of the Royal Engineers, employed in the Irrigation Department, has informed me that if the project he is now engaged upon, of storing water in connection with the river Kanhan, proves successful, a supply can be brought to 'Blogg's Drive.'

21. A copy of this letter has been forwarded to the Chief Commissioner Central Provinces, as directed.

P. S.—Since concluding this letter, I have received a note from the Superintending Engineer, which I consider of sufficient importance to give *in extenso.* It will be seen that Mr. Armstrong considers that the new hospital should be on 'Blogg's Drive' as indicated in the additions he has made to the smaller plan. This opinion supports my views in relation to the location of the Barracks also upon that ridge. Mr. Armstrong thinks that if the Field Battery be placed upon the site marked A, it will not be necessary to remove the bazaar connected with the Commissariat Cattle Lines; but I cannot support him in this opinion, for that bazaar will still be in objectionable proximity, and to windward during the N. E. monsoon. If, however, both the Barracks and Hospital be built on 'Blogg's Drive,' the Commissariat cattle sheds and bazaars need not be removed. Mr. Armstrong's note is as follows:—

"I send you, herewith, a tracing of the plan you called for. I could not "put the alternative site for the Field Battery on it as it does not take in the "locality. On the small plan (your own) I show this site, however, and it is an "excellent one I think, just as good as Horse Artillery site.

"The *Hospitals* should be on 'Blogg's Drive', in my opinion. They will be "there as near Barracks (new ones) as they are under existing circumstances to "present ones. When the time comes I propose to recommend Infantry Euro-"pean Barrack Hospitals to be on 'Blogg's Drive' too, and quarters for Surgeon. "The Camel sheds and Commissariat sheds should all be cleared away, and "removed to present Foot Artillery lines, if *they* are changed to the alternative "plan I propose. The existing buildings can be then utilized for a number of "purposes, and the bazaar need not be removed, or purchased.

"The Grand Magazine I would remove *in toto,* and build it some where in "Foot Artillery Horse lines if alternative site is adopted. I would say settle "Horse Artillery site where I propose, and consider change of Foot to where I "propose at A."

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APPENDIX III.

MEMORANDUM BY STAFF ASSISTANT SURGEON W. R., GRYLLS, M. D., WITH REGARD TO CHINDWARRAH AS A STATION FOR THE LOCATION OF EUROPEAN TROOPS.

CHINDWARRAH, *dated* 19*th February* 1869.

Geological formation.

The District of Chindwarrah presents a considerable variety of rocks. Around the chief station, and in a strip of country, stretching to the west of it as well as below the "Ghats", granite occurs with the usual metamorphic strata including marble. The greater part of the district, however, is covered with trap which in the south rests directly on the plutanic rocks, and in the north on sand-stone. Enclosed in the trap there is found an interesting fresh water deposit which at Buttoria, east of Chindwarrah, at Milenwarra south of it, and in various other localities, yields shells, &c., of the Eocene Epoch.

The strata next to this in age are of iron banded sand-stone which constitute the mass of "Mahadewa Hills" in the north-west of the district.

From the locality where these arenaceous beds are so largely developed, Dr. Oldham has given the name of "Mahadewa Hills" to this group which the late Rev. S. Hislop of the Nagpore Free Church Mission, was inclined to consider the equivalent of the upper Cretaceous rocks of Europe.

Underlying the ferruginous sand-stone there are met with beds of argillaceous sand-stone, shale and coal, the last of which has been met with in nearly fifty places above the "Ghats." The quality of this coal varies extremely, and in all instances in which it has been tested, it has proved itself to be inferior to ordinary English coal.

The soil is black where it over-lies the trap, and red where it rests on sand-stone or plutanic rocks. There is nothing to note particularly about the waters of the district, excepting the hot springs of Mohuljiri on the east of "Mahadewa Hills."

From the upland character of the district there are few marshes,

Physical Geography and Medical Topography.

The town of Chindwarrah is about seventy-six miles north of the Military station of Kamptee, and is estimated to be 2,300 feet above the level of the sea; to be in Longitude 78° 30′ 1″ east; and lattitude 22 4′ 0″ north, and said to contain rather less than 8,000 inhabitants of mixed races though principally Hindoos.

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It is situated on an elevated table land, and is a continuation of the rise of the "Tolon Ghat" which rises about 1,200 feet above the level of Nagpore, and is distant about eighteen miles from the station.

The surface of the country is very uneven presenting a succession of heights and hallows in different varieties. It is girded round by hills covered with low brush-wood, and the whole country is interspersed with clumps of large mangoo trees. The soil in and around the station is principally red gravel, and the water good.

There are two tanks or small lagoons near the town which are generally filled with water after the "rains." One being on the north, and the other north-east of the town, but they are not used for the purpose of irrigation, the cultivators depending on wells of which there are many scattered over the cultivated grounds.

A rivulet or nulla runs round a short distance from the town of irregular depth and breadth, serpentine in its course and taking its rise in a north-easterly direction. That portion of it which has to be crossed, in coming into the station, is from fifty to sixty yards wide, shallow, and with a sandy bed. In many places large blocks of slabs of granite from the embankment as well as in the bed of the stream exist, but in others the water continues deep even through the dry season.

The vegetation of the "Mahadewa Hills" approaches somewhat to that of temperate regions. Ferns abound, and a species of Thyme occurs. In the jungles west of the "Mahadewas" teak and bamboos are plentiful, and in other forest tracts, a considerable variety of useful but common timber may be obtained.

The products of the district, do not materially differ from those of other districts in this part of India, though it may be remarked that sugar-cane is cultivated to a large extent, and that potatoes are grown plentifully and with much advantage.

Wild animals abound as in other districts of the Central Provinces.

Climate.

Climate is agreeable throughout the greater part of the year, but April and May are hot months, as well as the early part of June, until the rains commence.

The nights, however, are not nearly so oppressive as at Kamptee or Nagpore.

Ice is frequently obtainable at night from the middle of November to middle of January. With regard to the climate of Chindwarrah itself as a residence for Europeans, I am of opinion that it cannot be considered a "Sanitarium," but it is a place in which Europeans will maintain a greater state of physical health than in Kamptee or Nagpore, other circumstances being equal.

Statistics of sickness.

The statistics of this station do not in any way afford reliable data to go upon with regard to the healthiness, or otherwise of the place, inasmuch as in very many instances injudicious selections were made from the Invalids of Kamptee as has been pointed out by the Inspector General of Hospitals, British Medical Service, Madras Presidency, in a Circular of which a copy exists among the records of the Convalescent Depôt,

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It is hardly my province to point out the stratagetical advantages of this place, but under the firm impression that Europeans would here maintain a far higher state of health than they could possibly do in such stations as Kamptee, Nagpore, or Jubbulpore, I consider it my duty, more particularly, as I have been requested by the Sanitary Commissioner to place my impressions on record in the form of a Memorandum to him, to state, that humanity dictates that this, or some other such place, should be selected for the erection of new Barracks, &c., for the location of Europeans in preference to Kamptee.

My knowledge of this place extends now very nearly over a period of eight years, and during that time, I have had charge of the soldiers for very nearly six years, and hence my opinion may be thought to be of some value.

If to be used only as a Convalescent Depôt, I suggest the following arrangement instead of the one that at present obtains, viz., after the Annual Invaliding Committees have weeded the corps, there will still probably remain very many men suffering from Asthenia to a certain extent, and other complaints of a more or less unimportant nature, but yet which on their being put to the annual course of training, cause them to break down and become frequent inmates of hospital. Such cases, I consider, would, if sent up, at the beginning of the cold season, and if the lightest possible duty were exacted from them, return to Kamptee, or the enervating climate of the plains, fit for duty for a considerable time, instead of having in all probability to be sent Home.

APPENDIX IV.

CHEMICAL REPORT ON THE WATER SUPPLY OF THE ROYAL ARTILLERY LINES, KAMPTEE.

The Barracks are supplied with water from wells on the barrack parade grounds; and the Officers' lines from wells in the compounds, with the exception of one house, on the bank of the river, which is unprovided with a well. The hospital has no well, and is supplied from a well in an adjacent compound. In the hot weather, water for tatties, &c., is drawn from the river Kanhan, if the wells run low.

The horsekeepers's lines are supplied mainly from public wells, but the bullock, camel, and elephant drivers get a good deal of water from the river Koolar, the above cattle being also watered at this river. The Koolar is thus polluted by the dropping of cattle, (and also by the drainage of the camel lines), before it falls into the Kanhan river, some 400 yards further east; and this affects the latter river considerably as, running along the north of the Cantonment, it affords a convenient source of water-supply to the native population. I am of opinion that the wells of Kamptee are fed principally by filtration of water from the Kanhan river along the strata of rock which lie below its sandy bed. This rock is a coarse-grained calcareous sandstone with occasional veins of hœmatite and quartz, and it dips to the south at a gentle incline. Masses of talc and beds of red gravel consisting principally of quartz and mica, are frequent about the bed of the river, and a nodular carbonate of lime mixed with clay, is common, and is largely worked for building purposes.

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The river water appears to filter through its sandy bed, especially during the rains; and penetrating down the inclined strata of rock, to form sheets of water easily reached by wells of 40 feet and upwards.

It will be seen by the following analysis that the effect of this filtration is to diminish the organic matter in the water, and to increase the mineral constituents. Of these, the carbonate of lime is derived from the rock itself, and the silicate of magnesia from the micaceous gravel so abundant in the subsoil. Talc is a silicate of magnesia, and appears to dissolve in water to some extent.

The large quantity of silica thus present in the water, varying from 2 to 6 grains per gallon, is not met with in English waters, while it is very common in India. The water from the tank at Bangalore which I analysed in 1863, contained $2\frac{1}{4}$ grains per gallon of silica; and the water at Saint Thomas' Mount, on being allowed to stand and renewed frequently, will coat a glass tumbler with a rough layer like sand-paper, insoluble in acid, and consisting principally of silica.

It is to the presence of silica in the water, that the superiority of Madras chunam is doubtless owing; the water contains naturally the substance, soluble silica, which in England, is artificially made by cement manufacturers, for the purpose of causing intimate combination between the sand and lime of which mortar is composed. Silica being naturally dissolved in the Madras water, and the solution of the lime being aided by the addition of sugar, the best possible conditions are secured for the combination of lime with sand. The good quality of Madras chunam is generally ascribed to the lime being made of shells, but that this is incorrect is proved by the bad quality of the chunam made in Malabar from shell-lime. The lime is the same in both cases, but the water of Malabar, remarkable for its extreme purity, contains little or no silica.

I regret that owing to my apparatus being of the most primitive description, I was unable to follow up many points of scientific interest connected with the water supply, and that I am only able to give plain facts of its composition.

	Water from Kanhan river, December 20, grains per gallon.	Water from well in compound No. 16, R. A. Line, December 18, grains per gallon.	Water from well of Field Battery Barracks, December 22, grains per gallon.
Organic matters	1·20	0·40	0·40
Chlorine	·62	1·24	1·89
Silica	2·25	6·00	3·15
Carbonic acid } Sodium }	not estimated.		
Lime	2·92	5·16	5·94
Magnesia	1·15	3·66	1·28
Alumina and Oxide of Iron	·20	traces	traces
Empirical formula.			
Organic matters	1·20	0·40	0·40
Chloride of Sodium	1·02	2·05	2·46
Carbonate of Lime	5·20	9·20	10·60
Silicate of Magnesia } Carbonate of Magnesia }	3·40	9·98	4·43
Alumina and Oxide of Iron	·20	traces	traces
Total solids...	11·02	21·63	17·89

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The amount of chlorides contained in these waters is not large, about the same as that of the London water supply, and quite unobjectionable.

The amount of carbonate of lime is much less than that contained in the chalk water, of England; it is removeable in great part by boiling, and is not only unobjectionable, but wholesome. I may instance that the pure water of Malabar is unpleasant from the absence of the carbonate of lime, which dissolved by carbonic acid causes the pleasant sparkle and lightness of many spring waters.

The silicate of magnesia, accompanied probably by a little carbonate of magnesia, is in such large quantity that it cannot be without some action on the digestive organs when used for drinking, and that action cannot but be bad. All the salts of magnesia (excepting perhaps the carbonate when in small quantity) are unwholesome when contained in drinking-water.

Analysis of the deposit in a boiler shows that the condition of the magnesia is altered by boiling; double decomposition ensues, the silica being deposited in combination with the lime, while the magnesia remains in great part dissolved as carbonate.

Deposit in a boiler, in which water from compound No. 16 is habitually boiled.

Composition per cent.		*Empirical formula.*	
Water	3·70	Water	3·70
Silica	17·00	Carbonate of Lime	44·30
Carbonic Acid	24·33	Silicate of Lime	37·60
Lime	45·47	Carbonate of Magnesia	9·45
Magnesia	4·50	Alumina and Oxide of Iron	5·00
Alumina and Oxide of Iron	5·00		100·05

Magnesia, especially in the form of silicate is inimical to the production of a lather with soap; and in these waters its presence utterly defeats any attempt to analyse the water by the method known as the "soap test." The method which I devised some years ago for the volumetrical analysis of waters by medical officers, being partly based upon the use of a test solution of soap, is therefore inapplicable to this class of Indian waters, and the gradimetrical method is alone admissible.

The organic matters in the well-waters are of small amount and apparently, of harmless character. Those in the river-water demand some consideration as the following analyses show:—

23rd December 1868.	Grains per Gallon.	
	Chlorine.	Organic matters.
Koolar, 200 yards above the confluence, 8 A. M.	0·87	1·07
Do. do. 1 P. M.	1·05	1·38
Kanhan, 200 yards above the confluence, 8 A. M.	0·57	0·46
Kanhan, 100 yards below the confluence, 8 A. M.	0·62	0·77

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It is thus seen that the Kanhan is polluted to a great extent by the affluence of the Koolar (in which public cattle are watered, and refuse is often deposited) at its entrance into the Cantonment, and the organic matters appeared, during analyses, to be of such a nature as would be got rid of with difficulty.

While living in a house (before mentioned) dependent on the river Koolar for its water-supply, I often remarked a smell of camel's dung strongly apparent on warming the bathing water during the cold weather by the addition of a kettle-ful of boiling water.

Were this source of contamination removed, the river water would be of rather superior quality to that obtained from wells.

EDWARD NICHOLSON, Assistant Surgeon.
F-20th Royal Artillery.

KAMPTEE 26*th December* 1868.

APPENDIX V.

FORM of Hospital Ticket or

REGISTER of Medical Examinations of Registered Prostitutes, in the Cantonment of Kamptee.

Name
No. in Register of Prostitutes

Year and Month.	Dates of Medical Examinations, and Signature of Medical Officer.				Remarks.
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

FORM of Prostitutes, Ticket.

TICKET of Registered Prostitute in the Cantonment of Kamptee.

Name
Caste
Registered Number
Place of residence in Cantonment
Date of Registry
Personal Appearance }

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Year and Month.	Date of Medical Examination, and Signature of Medical Officer.				Remarks.
	Date of Inspection in first half of Month.	Signature of Medical Officer.	Date of Inspection in second half of Month.	Signature of Medical Officer.	
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

Abstract of Regulations to be observed by Registered Prostitute. No.—in the Cantonment of Kamptee.

1. She shall obey all rules laid down by the Government under Class 7, Section 19, of Act XXII. of 1864, and will be liable on conviction of a breach of any such rule to fine and imprisonment according to the provisions of the said Act.

2. If she desire to have her name removed from the register, she shall apply to the Cantonment Magistrate.

3. She shall pay monthly to the Lock Hospital Fund such sum that may be fixed by the Committee not exceeding a rupee, except during such time as she may be under treatment in Lock Hospital, when such payment will cease.

4. She shall not transfer or lend her ticket to any other person on any account, or for any purpose whatsoever.

5. She shall present herself with her ticket for medical examination, at such time and place as may be appointed, unless specially exempted from so presenting herself.

6. If at any time she becomes affected with any veneral disease, she shall remain under treatment in the Lock Hospital until discharged, during such treatment she will receive subsistence allowance from the Hospital Fund, and will be liable to no charge on account of subsistence or treatment.

7. She shall allow the inspection of her house by any duly authorized officer, and shall, when required to do so, exhibit her ticket to such officer.

8. She shall obey all rules laid down for maintaining her house in a state of cleanliness, and for provision therein of water and means of ablution.

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9. If she desire to change her place of residence, or to leave the cantonment, she shall signify her wish to the Cantonment Magistrate.

10. She shall not practice her trade in any other Cantonment in which she has not been duly registered.

11. She shall not publicly solicit any person.

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			Artillery and Cavalry.			Sick in Hospital and Quarters.						Public Cattle and Sick Carriage.								
						Europeans.			Natives.											
	…Pension.	Tindals.	Lascars.	Horses.	Horse-keepers.	Grass-cutters.	Commissioned Officers.	Warrant Officers and Staff Serjeants.	Rank and File.	Native Officers.	Non-Commissioned Rank and File.	Native attached.	Elephants.	Camels.	Bullocks.	Mules.	Sick Carts.	Dhoolees.	Head Maistry.	Petty Maistry.	Dhoolee Bearers.
Head Qu…	...	...	...	11	5	4	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...
A. Batter…	...	...	...	172	118	155	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...
C. Batter…	...	1	12	102	74	92	1	...	7	...	...	13	...	...	...	...	...	...	...	...	...
F. Batter…	...	1	12	107	71	92	...	...	15	...	2	...	...	...	...	...	...	...	...	...	...
90th Reg…	...	...	...	...	...	...	2	...	24	...	...	...	...	...	...	...	...	...	...	...	...
1st Regim…	1	...	...	289	125	259	1	...	...	1	11	...	...	...	...	...	...	...	...	...	...
1st Regim…	31	...	...	...	...	...	...	...	...	1	41	...	...	...	...	...	...	...	...	...	...
Right Wi…	6	...	...	...	...	...	...	1	...	...	15	...	...	...	...	...	...	...	...	...	...
Doing Gen…	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Commissa…	...	...	...	...	...	...	...	...	...	...	...	...	12	230	216	97	...	...	2	6	82
Deputy In…	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assistant …	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Assistant …	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Deputy Ju…	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Barrack D…	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Executive …	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Ecclesiasti…	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	38	2	24	681	393	602	5	1	51	2	69	13	12	230	216	97	...	...	2	6	82

…RE, Major,
…st. *Adjutant General.*

(Signed) W. FENWICK, Brigadier General,
Commanding, Nagpore Force.

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APPEN

DETAILED STATEMENTS

Detailed Statement of accommodation in the Bar

BLOCK AND ROOM. Block No.	Room.	How occupied, whether by Troops, Officers, Married men, &c.	Dimensions. Length. ft. in.	Breadth. ft. in.	Height. ft. in.	Superficial area of each room.	Cubic contents of each room.	Number of cots in each room.	Number at 90 square feet superficial area.
1 to 10 ...	Barracks ...	Non-Commissioned Officers and men	253	24	17	6,072	1,03,224	66	67
	2 Rooms each ...	Serjeant's quarters ...	16	13 6	17	216	3,672	2	2
	2 ,, ...	Serjeant's quarters ...	16	9 4	17	149	2,538	...	...
	2 ,, ...	Serjeant's quarters ...	7	10	9	70	630	...	...
11 ..	Guard room ...	By Serjeant, Corporals, and Guard	86	19	11	1,634	17,974	15	18
	1 Prison ,, ...	Prisoners	19	19	11	361	3,971	3	4
	4 Cells each ...	,, ...	19	12	11	228	2,508	1	2
	4 ,, ...	,, ...	10	11	11	110	1,210	1	1
	1 Office	Orderly-room	46	19	5	...	...	...	...
	1 Pay room ...	Pay Office	65	11	7	...	...	...	...
	1 Serjeant's room ...	Serjeant's room (Guard) ...	19	17	15	323	4,845	1	3
	1 Urinary	Urinary	6	6	8	...	...	...	...
1 ...	Cook-house ...	Cook-houses	81	10	10	...	...	...	...
2 ...	,, ...	,, ...	81	14	10	...	...	...	...
3 ...	,, ...	,, ...	81	14	10	...	...	...	...
4 ...	,, ...	,, ...	81	10	10	...	...	...	...
5 ...	,, ...	,, ...	81	10	10	...	...	...	...
1 to 10 ...	Wash-house ...	Wash-houses	40	14	12	...	...	...	...
	4 Bath-rooms each	,, ...	5	5	9	...	...	...	...
	1 Urinary ...	,, ...	16	5	9	...	...	...	...
1 & 2 ...	Double Latrine ...	Latrines	...	...	...	...	...	...	...
	1 Room	,, ...	30 6	12 6	14	...	...	...	...
	1 ,, ...	,, ...	30 6	12 6	14	...	...	...	...
3 ...	Latrine... ...	,, ...	33	12	14	...	...	...	...
4 & 5 ...	Double Latrine ...	,, ...	...	...	...	...	...	...	...
	1 Room	,, ...	30 6	12 6	14	...	...	...	...
	1 ,, ...	,, ...	30 6	12 6	14	...	...	...	...
6 to 10 ...	Latrine	,, ...	20	11	6				
1 & 2 ...	Plunge baths ...	Plunge Baths	58	27	10	...	...	...	...
	1 Bath	,, ...	46	14	5 6	...	...	...	...
	1 Aqueduct ...	,, ...	40	1 6	4 6	...	...	...	...
	1 Canteen ...	Canteen	75	14	12	1,050	12,600	...	...
	1 Room	,, ...	20	14	12	280	3,160	...	...
	1 Coffee Shop ...	Dry Canteen	37	16	10	...	...	...	...
	1 Room	,, ...	27	16	10	...	...	...	...
1 ...	Engine-house ...	Engine-house	20	10	7	...	...	...	...
2 ...	,, ...	,, ...	20	10	7	...	...	...	...
	1 Serjeant's Mess.	Serjeant's Mess	85	15	5	1,275	6,375	...	...
	1 Room	,, ...	15	12	15	180	2,700	...	...
	1 ,, ...	,, ...	15	17	15	255	3,825	...	...
	1 Verandah ...	,, ...	26	8	7	...	...	...	...
	2 Rooms each ...	Quarter Master's Office ...	12	8	9	...	...	...	...
	2 ,, ...	,, ...	15	12	9	...	...	...	...
	2 ,, ...	Armourer's Shop ...	15	12	9	...	...	...	...
	2 ,, ...	,, ...	12	8	9	...	...	...	...
	1 Room	Regimental Store's, Quarter Master	30	16	11	...	...	...	...
	1 ,, ...	,, ...	29	14	9	...	...	...	...
	1 ,, ...	,, ...	33 6	10	10	...	...	...	...
	1 ,, ...	Magazine	12	10	6	...	...	...	...
1 ...	Skittle Alley ...	Skittle Alley	68	18	9	...	...	...	...
2 ...	,, ...	,, ...	68	18	9	...	...	...	...
	1 Room	Black Smith's Shop ...	16	12	10	...	...	...	...
	1 ,, ...	Ration Shed (Store) ...	20	12	9	...	...	...	...
	1 Shed	,, ...	20	12	9	...	...	...	...

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DIX VII.

OF ACCOMMODATION.

racks of Her Majesty's British Infantry, Kamptee.

Cubic contents thus afforded.	Number to be accommodated at minimum standard.	Number in excess on inspection.	Openings. Ventilation.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining rooms.	Date of construction.	Remarks.
					ft. in.	ft. in.		ft. in.	ft. in.			
1,510	67	...	* ...	24	6 3	4 3	20	7 6	4 0	8	From 1824 to 1844.	Ridge ventilation to Nos. 1 and 10 continuous, in others in three sections.
1,8[illegible]	2	...	* ...	1 & 2	5 3	3 3	2	7 3	4 3	...		
...	...	...	* ...	1	4 3	3 3	1	7 3	4 3	...		
...	...	...	* ...	...	...	...	2	6 3	3 3	...	...	
999	18	...	...	1	6	4	6	7 6	4	...	1829.	A double storied building. Pay Office and orderly room in upper floor.
992	4	4	...	1	6	4	1	7 6	5	...	...	
1,254	2	...	...	...	...	...	1	7 6	4	...	...	
1,210	1	...	...	...	...	...	1	7 6	4	...	...	
...	...	...	...	6	4 3	3 3	2	7 6	5	...	...	
...	...	...	...	6	4 3	3 3	2	7 6	5	...	...	
1,615	3	...	...	2	6	4	1	7 6	4	...	...	
...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	Ridge ventilation throughout the entire length of each cook-room.	...	...	...	4	7	4	1	1829. 1857.	
...	...	...		...	...	...	4	7	4	1	1828.	
...	...	...		...	...	...	4	7	4	1	1829.	
...	...	...		...	...	...	4	7	4	1	1832.	
...	...	...		...	...	...	4	7	4	1	1845.	
...	...	...	...	Upper 6	3 6	2 0	2	7	4	...	1859.	Six upper windows to each of the ten wash-houses used as ventilators as well as for admission of light, and eight open tile work arch to each window.
...	...	...	...	...	...	...	...	...	...	4	...	
...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	1863.	Six upper windows to each single urinal for ventilation and light.
...	...	...	...	Upper 6	3 6	2	3	7 6	5	...	...	
...	...	...	...	Upper 6	3 6	2	3	7 6	5	...	...	
...	...	...	...	Upper 6	3 6	2	3	7 6	5	...	1862.	
...	...	...	...	...	...	...	...	...	...	...	1863.	
...	...	...	...	Upper 6	3 6	2	3	7 6	5	...	...	
...	...	...	...	Upper 6	3 6	2	3	7 6	5	...	...	New. Open all round three feet between roof and top of wall.
...	...	...	Ridge.	...	...	...	...	...	...	...	1865.	
...	...	...		...	...	...	1	7 6	4	...	1863.	
...	...	...		...	...	..	...	...	...	...	...	
...	...	...		...	...	...	...	...	...	...	...	
...	...	...	...	5	4 9	3 9	1 4	8 7 6	6 4	...	1836.	
...	...	...	...	4	4 9	3 9	1	7 6	4	...	...	
...	...	...	...	6	4 9	3 9	1	8	6	...	1838.	
...	...	...	...	4	4 9	3 9	1	7 6	4	...	...	
...	...	...	...	...	...	...	1	Double	Gateway	...	1862.	
...	...	...	...	...	...	...	1	Do.	Do.	...	1862.	
...	...	...	Ridge ventilations throughout full length of Serjeants' Mess.	2 4 Upper	4 9 3 6	3 9 2 0	4	8	6	...	1841.	Six upper windows for ventilation as well as light.
...	...	...		1	4 9	3 9	1	8	6	...	...	
...	...	...		1	4 9	3 9	1	8	6	...	...	
...	...	...			...	...	...	...	...	...	...	
...	...	...	1	1	4 9	3 9	1	7	4	3	1832.	
...	...	...	1	1	4 9	3 9	1	7	4	...	...	
...	...	...	1	1	4 9	3 9	1	7	4	3	1845.	
...	...	...	1	1	4 9	3 9	1	7	4	...	...	
...	...	...	...	2	4 9	3 9	1	7	4	...	1829.	
...	...	...	...	3	4 9	3 9	1	7	3	...	...	
...	...	...	...	2	4 9	3 9	...	...	...	...	...	
...	...	...	...	...	...	...	1	6 3	2 9	...	1838.	
...	...	...	...	...	...	...	...	...	...	...	1860.	
...	...	...	...	...	...	...	...	...	...	...	1860.	
...	...	...	1	1	4 9	3 9	1	7 6	4	...	1834.	
...	...	...	...	2	4 9	3 9	1	7 6	4	...	1863.	
...	...	...	...	...	...	...	2	Double Gateway		...	...	

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Detailed statement of accommodation in the Barracks of

Block and Room.		How occupied, whether by Troops, Officers, Married men, &c.	Dimensions. Length.	Breadth.	Height.	Superficial area of each room.	Cubic contents of each room.	Number of cots in each room.	Number at 90 square feet superficial area.
	1 Room	Shoemakers' Shop	27	21	10	...	...	...	...
	1 "	Carpenter's "	27	21	10	...	...	...	...
	1 "	Serjeant Major's Quarters ...	16	16	18	256	4,608	...	...
	2 " each ...	" " ...	17	10	10	170	1,700	...	...
	1 "	" " ...	24	10	10	240	2,400	...	...
	1 Bath-room ...	" " ...	14	10	10	...	...	...	...
	1 Cook-house ...	" " ...	15	12	9	...	...	...	...
	1 Latrine ...	" " ...	6	6	9	...	...	...	...
	1 Room	Quarter Master Serjeant's Quarters	16	16	18	256	4,608	...	...
	2 " each ...	"	17	10	10	170	1,700	...	...
	1 "	"	24	10	10	240	2,400	...	...
	1 Bath-room ...	"	14	10	10	...	..	...	...
	1 Cook-house ...	"	15	12	9	...	...	...	...
	1 Latrine ...	"	6	6	9	...	...	...	...
	2 Rooms each ...	Regimental School ...	80	18	16	...	...	...	...
	4 "	"	8	8	10	...	...	...	...
	1 Cook-house ...	"	12	8	8	...	...	...	...
	2 Latrines each ...	"	16	6	8	...	...	...	...
	1 Room (Cells) ...	"	17	8	10	...	...	...	...
81 to 92 ...	2 Rooms each ...	Six Double Family Quarters	16	16	16	256	4,096	... Two families each double block.	...
	4 "	"	16	8	10	128	1,280		...
	2 "	"	8	8	10	64	640		...
	1 Cook-room ...	"	15	12	9	...	...		...
	1 Latrine (men) ...	"	12	6	9	...	...		...
	1 " (women).	"	12	6	9	...	...		...
1 to 80 ...	20 Rooms each ...	Ranges, Family Quarters ...	18	12	14	216	3,024	... Twenty families.	...
	20 " " ...	"	12	12	11	144	1,584		...
	2 " " ...	"	9	9	11	81	891		...
	18 " " ...	"	8	6	8	48	384		...
	4 Cook-rooms ...	"	18	10	8	...	...		...
	6 Bath-rooms ...	"	8	8	8	...	...		...
1 to 5 {	8 Rooms ...	Latrines	12	7	9	...	...	...	...
	2 "	"	11	6	7	...	...	...	...
	1 Room... ...	Infant School	20	14	9	...	...	...	...
	2 " each ...	"	15	8	9	...	...	...	...
	1 Bath-room ...	"	12	8	8	...	...	...	...
	1 Latrine ...	"	12	10	10	...	...	...	...
	12 Cells each ...	Solitary Cells	8	8	12	64	768	...	...
	12 Latrines ...	"	3	9	12	...	...	...	...
	1 Room ...	Watchmaker's Shop ...	20	15	10	...	...	...	...

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Her Majesty's British Infantry, Kamptee—(Continued).

Cubic contents thus afforded.	Number to be accommodated at minimum standard.	Number in excess on inspection.	Openings.	Windows.			Doors.			Open arches to adjoining rooms.	Date of construction.	Remarks.
			Ventilation.	Number.	Height.	Width.	Number.	Height.	Width.			
								ft. in.	ft. in.			
...	...	...	...	8	3	3	1	7	4	...	1866.	New.
...	...	...	...	8	3	3	2	7	4	...	1866.	New.
...	...	...	...	2	3	3	1	7	4	...	1859.	
...	...	...	...	2	3	3	1	7	4	...	...	
...	...	...	1	...	...	...	4	7 3	4 3	...	...	
...	...	...	...	1	3	3	1	7	4	...	...	
...	...	...	...	...	...	...	1	7 6	4	...	...	
...	...	...	...	...	...	...	...	...	...	...	...	
							4	7 3	4 3	...	1860.	
...	...	...	...	...	...	...						
...	...	...	..	2	3	3	1	7	4	...	...	
...	...	...	1	1	3	3	1	7	4	...	...	
...	...	...	...	..	...	...	1	7 6	4	...	...	
...	...	...	...	...	...	...	1	7 6	4	...	...	
...	...	...	...	2	...	...	...	...	...	...	...	
...	...	...	...	2½ circle	...	...	6	7 6	4 3	16	1828.	
...	...	...	...	1	4 9	3 9	1	7 6	4 3	...	...	
...	...	...	..	...	...	...	1	7	4	...	1860.	Four end semi-circular Fan-lights.
...	...	..	...	...	...	...	...	...	...	...	1860.	
...	...	...	..	...	...	...	1	7	4	...	1838.	
...	...	...	3	...	...	...	4	7 6	4 3	...	1862.	
...	...	...	...	1	4	4	1	7 6	4 3	...	1863.	
...	...	...	...	2	4	4	1	7 6	4 3	...	...	
...	..	...	1	...	...	...	1	7 6	4 3	...	...	
...	...	...	1	...	...	...	...	...	...	...	...	
...	...	...	1	...	...	...	...	...	...	...	...	
...	...	...	Ridge ventilation throughout.	1	3 3	3 3	1	7 6	4 3	...	1864-65-66.	
...	...	...		...	...	...	2	7 3	4	...		New.
...	...	...		2	2	2	1	6 3	3 3	...		
...	...	...		2	2 9	1 9	2	6	3	...		
...	...	...		...	...	...	2	6 3	4 3	...		
...	...	...		...	...	...	2	6	3		...	
...	...	...	...	...	...	...	...	...	...	...	1864 to 1867	New. Open for about three feet between roof and top of wall. Wall supported by pillars.
...	...	..	...	...	...	...	...	...	...	...		
...	...	...	Ridge ventilation throughout.	4	4 9	3 9	2	7 6	4 3	...	1824.	
...	...	...		2	2 9	1 9	2	6	4	...	...	
...	...	...		1	2 9	1 9	1	6	4	...	...	
...	...	..	...	...	...	...	...	...	...	...	...	
...	...	...	..	...	...	...	1	6 3	4	...	4 in 1829 8 in 1830	
...	...	...	..	...	...	...	...	...	...	...	...	
...	...	...	1	4	4 9	3 9	2	6 3	4	...	1862.	

(Signed) W. P. BATTISCOMBE, Major,
Commanding 91st Highlanders.

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Detailed Statement of accommodation in the Barracks

Block and Room.		How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	Number of Cots in each room.	Number at 90 square feet superficial area.
			Length.	Breadth.	Height.				
Block No.	Room.		ft. in.	ft. in.	ft. in.				
1	1	Right half Battery	200	21 3	17 3	4,250	73,312	55	47
	1	Non-Commissioned Officers	9 10	21 3	17 3	208	3,588	2	2
2	1	Left half Battery	178 3	21 3	17 3	3,787	65,325	51	42
	1	Coffee room	19 6	21 3	17 3	...	...	...	...
	1	Orderly Serjeants	9 10	21 3	17 3	208	3,588	1	2
3	1	Cooking	45 2	25 1	11	...	...	...	...
4	1	Privy	48 10	12 1	16 5	...	...	...	...
5	1	Wash-house	40	14	13 6	...	...	...	...
		Staff Serjeant's and Orderly room ...	91	25 5	14 6	2,313	33,638	2	253
6	1	Room	18	12	10 6	216	2,268	...	2
	1	Bed room	14 1	12 2	14	171	2,394	...	1
	1	Back verandah	17 9	8 1	10	...	...	...	...
	1	Front do.	18	6 6	10	...	...	...	...
	1	Bath-room	8	8	10	...	...	...	...
	1	Cook-room	8	12	9	...	...	...	...
	1	Front verandah	56 6	8 3	7	...	...	...	...
	1	Privy	12	12	18	...	...	...	...
7		Gram godowns	22 2	12 1	10	...	...	...	...
8		Harness room	64	19	15	...	...	...	...
9		Shoeing shed	30	18 4	6 6	...	...	...	...
10		Urinals	16	16	12	...	...	...	...
13		Sick stables	70	25 5	10	...	...	...	...
		Front and rear verandah, each	81 2	8	7 6	...	...	...	...
	1	Surgery	9	8	10	...	...	...	...
14		Guard-room	27	16	14 9	432	6,372	10 N. C. Rank and File.	4
		Front verandah	61	8 6	8	...	...		...
	1	Prison	15 1	16	14 9	241	3,554		2
		Rear verandah	75 11	8	8	...	...		...
	1	Room	17	8	8	136	1,088		...
	1	Bath-room	15	8	8	...	...		...
	1	Privy	12	9	11 6	...	...		...
15		Gun shed	100	22	9	...	...	...	...
	1	Store room	38	22	9	...	...	...	...
	1	Do.	9 7	22	9	...	...	...	...
16		*Range Family Quarters, each containing.*							
	1	Sitting room	16	16	17	...	...	12 Families.	...
	1	Bed room	16	8	14	...	...		...
	1	Bath-room	8	8	11	...	...		...
	1	Verandah	24	8	11	...	...		...
	1	Cook-house	10	10	13	...	...		...
	1	Privy	10	5	9	...	...		...
18		Range of eight family quarters	98	34 6	14	...	...	8 Families.	...
	1	Verandah	116	42	8	...	...		...
	1	Bath-room	8	8	9	...	...		...
	1	Cook-house	21	13	15	...	...		...
	1	Latrine	...	...	...	...	...		...

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of the C. Battery D. Brigade Royal Horse Artillery.

Cubic contents thus afforded.	Number to be accommodated at Minimum Standard.	Number in excess on inspection.	Openings.	Windows.			Doors.			Open arches to adjoining rooms.	Remarks.
			Ventilation.	Number.	Height.	Width.	Number.	Height.	Width.		
					ft. in.	ft. in.		ft. in.	ft. in.		
1,559	47	8	1	30	5 6	4 5	14	7 8½	4 7	...	
179	2	...	1	1	5 6	4 5	2	7 8½	4 7	...	
1,555	42	9	1	32	5 6	4 5	5	7 8½	4 7	...	A portion of barrack room partitioned off.
...	...	...	1	8	5 6	4 5	2	7 8½	4 7	...	
1,794	2	...	1	1	5 6	4 5	1	7 8½	4 7	...	
...	...	...	...	...	...	...	5	7 8½	4 7	...	
...	...	...	...	8	2 6	4 6	4	7 8½	4 7	...	
...	...	...	...	6	2 6	4 6	2	7 8½	4 7	...	
1,345	253	...	1	6	5 6	4 5	5	7 8½	4 7	...	
1,134	2	...	1	1	5 6	4 5	1	7 8½	4 7	...	
2,394	1	...	1	1	4 9	3 6	1	7 8½	4 7	...	
...	...	...	1	3	5 6	4 5	...	...	...	...	Enclosed.
...	...	...	1	...	...	...	...	...	...	...	
...	...	...	1	...	...	...	1	6	3 6	...	
...	...	...	1	...	...	...	1	6	3 8	...	
...	...	...	1	...	...	...	...	...	...	...	
...	...	...	1	...	...	...	1	6	3 8	...	
...	...	...	...	...	...	...	1	6 5	2 10½	...	
...	...	...	...	157	4 6	3 6	11	7 8½	4 7	1	
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	New.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	1	4 6	3 6½	1	6	4	...	
1,593	4	...	...	2	5	3 6	2	7 8½	4 7	...	
...	...	...	...	...	...	...	...	...	...	...	
1,777	2	...	...	...	...	...	2	7 8½	4 7	...	
...	...	...	...	3	5	3 6	3	7 8½	4 7	...	
1,088	...	...	...	...	...	...	1	7 8½	4 7	...	
...	...	...	...	...	...	...	...	...	...	...	Half new.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	6	5	4	1	7	4 7	...	
...	...	...	...	2	5	4	1	7	4 7	...	
...	...	...	...	...	...	...	...	...	...	...	Six blocks occupied by twelve families.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	4	4 6	3 9½	4	7 8½	4 7	...	
...	...	...	...	...	...	...	...	...	...	...	Three blocks for the use of the above.
...	...	...	...	...	...	...	1	6 7	3 8	...	
...	...	...	...	...	...	...	...	...	...	1	
...	...	...	...	16	3	2 6	18	6 7	3 8	...	New,
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	2	2 6	2 6	1	6	3	...	
...	...	...	...	...	...	...	6	6	3	...	
...	...	...	...	...	...	...	...	...	...	...	On Hathaway's principle.

(Signed) P. D. HORNE, Captain, (Local Major,)

Commanding C. Battery D. Brigade R. H. A.

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Detailed Statement of accommodation in the Head

Block and Room.	How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions. Length.	Breadth.	Height.	Superficial area of each room.	Cubic contents of each room.	No. of Cots in each room.	No. at 90 square feet, superficial area.
		ft. in.	ft. in.	ft. in.				
	Recreation Room	...	...	...	...	...	...	...
	Library Room, 1	28 0	22 0	8 10	616	5,441	...	...
	Do. do. 1	12 0	22 0	8 10	264	2,332	...	...
	Workshops...	...	...	...	...	...	...	...
	Canteen, 1 room	32 0	20 0	15 0	640	9,600	...	...
	Do. 3 do. each....	15 0	10 0	12 3	150	1,837	...	...
	Do. 1 do.	22 6	10 0	12 3	225	2,756	...	...
	Do. 1 Verandah...	17 0	10 0	12 3	170	2,082	...	...
	Do. Urinal	10 6	10 6	7 4	...	...	...	...
	Cook Rooms	...	...	...	...	...	...	...
	Coffee Shops	...	...	...	...	...	...	...
	Ablution Rooms.	...	...	...	...	...	...	...
	Plunge Bath, men	52 6	27 0	14 0	...	...	...	...
	Do. do. women...	20 0	27 0	14 0	...	...	...	...
	Harness and Saddle Rooms	...	...	...	...	...	...	...
	Gymnasium	*m*52 0	*m*41 3	*n* 14 6	...	...	...	...
	Ball Court	82 5	34 6	30 0	...	...	...	...
	Skittle Alley	50 0	15 0	6 0	...	...	...	...
	Military Prison	...	...	...	...	...	...	...
	Dry Room	41 0	17 0	25 0	697	17,425	...	7
	4 Cells, each	21 0	17 0	25 0	357	8,925	...	3
	4 Rooms, each	17 0	11 0	12 0	187	2,244	...	2
	1 Do.	9 6	10 0	11 9	95	1,118	...	1
	4 Working Cells, each	35 6	11 0	12 0	390	4,680	...	...
	2 Verandahs do...	40 0	10 0	10 0	400	4,000	...	...
	Solitary Cells	...	...	...	...	...	...	...
	Guard Room	...	...	...	...	...	...	...
	Prison Room	...	...	...	...	...	...	...
	Latrines	...	...	...	...	...	...	...
	Urinals	...	...	...	...	...	...	...
	Stables	20 0	10 0	...	...	...	...	...
	Veterinary Hospital...	...	...	...	...	...	...	...
	Gram boiling shed	...	...	...	...	...	...	...
	Quarters, Officers	...	...	...	...	...	...	...
	Do. 2 N. C. Staff each, 1 room ...	16 0	16 0	20 0	256	5,120	...	...
	Do. do. 2 do. ...	10 2	16 0	16 0	162	2,592	...	...
	Do. do. 1 do. ...	20 10	10 0	16 0	208	3,328	...	...
	Do. Bath-room	10 0	10 0	16 0	100	1,600	...	...
	Do. Cook-room	12 0	12 0	8 3	...	...	...	...
	Do. Latrine	6 0	6 0	8 0	...	...	...	...
	Do. 2 Assistant Instructors, Gunnery.	...	...	...	...	...	...	...
	Each do 2 rooms	21 0	17 0	13 6	357	4,819	...	...
	Do. do 1 Bath-room	10 0	7 0	10 0	70	700	...	...
	Do. do 1 Cook-room	7 0	8 0	8 6	...	...	...	...
	Do. do 1 Latrine	8 0	4 6	10 0	...	...	...	...
	School-room	70 0	41 4	18 0	2,893	52,070	...	...
	Do. 2 small rooms each	12 6	5 8	18 0	70	1,260	...	...
	Do. Girls' Latrine...	12 0	6 2	7 8	...	...	...	...
	Do. Boys' do.	10 0	10 0	7 9	...	...	...	...
	Shed for Fire Engine	15 0	13 0	8 0	...	...	...	...
	Ration shed	40 0	12 0	8 0	...	...	...	...

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Quarters of the 20th Brigade Royal Artillery, Kamptee.

Cubic contents thus afforded.	No. to be accommodated at Minimum Standard for.	No. in excess on inspection.	Openings. Ventilation.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining rooms.	Remarks.
					ft. in.	ft. in.		ft. in.	ft. in.		
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	5	3 8	3 6	2	7 2	4 8	...	Under same roof as Brigade Officers.
...	...	...	...	1	3 9	3 8	1	7 2	4 8	...	Do.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	1 *h.*	2	6 8	6 3	3	7 10	4 9	...	*h.* Attic window.
...	...	...	...	6	2 4	4 0	1	7 10	4 9	2	
...	...	...	2 *i.*	2	5 5	4 0	3	7 10	4 6	2	*i.* Attic windows.
...	...	...	...	...	...	...	...	...	...	...	Open Verandah.
...	...	...	1 *j.*	...	...	...	...	...	...	...	*j.* Open between top of wall and roof.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	12 *k.*	6 6	6 0	1	7 6	4 8	...	*k.* Honey combed windows.
...	...	...	...	6 *l.*	6 6	6 0	1	7 6	4 8	...	*l.* Do.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	...	...	...	...	...	...	...	*m.* Length and width of foundation, *n.* height of apparatus.
...	...	...	...	...	...	...	...	...	...	...	Open air.
...	...	...	1 *o.*	...	...	...	...	...	...	...	*o.* Low parapet wall, open between wall and roof.
...	...	...	...	...	...	...	...	...	...	...	
2,489	7	...	Ridge. 5	2	5 8	4 8	1	8 1	5 8	2	
2,975	3	...	Ridge. 2	...	...	...	1	8 3	5 2	1	
1,122	2	...	Ridge. 3	...	...	...	...	...	...	1	New.
1,118	1	...	Ridge. 3	...	...	...	...	...	...	1	Latrine.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	2	5 9	4 6	1	8 3	5 2	*p.* 2	*p.* Leading into cells.
...	...	...	...	...	...	...	...	...	...	...	See Military Prison.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	...	...	...	...	...	...	...	None, see Military Prison.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Open air lines.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	...	...	...	...	...	...	...	None, use of F. 20 R. A.
...	...	...	...	...	...	...	...	...	...	...	No public quarters.
...	...	...	Ridge. 1	...	...	...	4	8 3	5 0	...	Open verandah in front.
...	...	...	...	1	4 9	3 6	2	...	...	...	
...	...	...	...	2	4 9	3 6	...	8 3	5 0	...	
...	...	...	...	1	4 9	3 6	1	7 0	4 3	...	
...	...	...	3 *q.*	...	...	...	1	6 9	3 5	...	*q.* Open oval apertures.
...	...	...	8 *r.*	...	...	...	1	6 3	2 6	..	*r.* Do.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	Ridge. 1	3	5 9	4 0	3	7 9	4 8	2	
...	...	...	1 *s.*	...	...	...	1	6 8	2 10	...	*s.* Attic window.
...	...	...	1 *t.*	...	...	...	1	6 9	4 0	...	*t.* Open oval apertures in wall.
...	...	...	1 *u.*	...	...	...	1	6 0	2 3	...	*u.* Do.
...	...	...	8 *v.*	...	...	...	4	8 3	5 3	2	*v.* Attic windows, school room surrounded by open verandah.
...	...	...	...	2	4 3	3 6	2	6 6	4 3	...	
...	...	...	10 *w.*	...	...	...	1	6 8	2 8	...	*w.* Open oval apertures in wall ventilated by open space between walls and roof.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	1	7 11	10 0	...	
...	...	...	...	...	...	...	...	...	...	...	Part open sides.

(Signed) F. W. BOND, Colonel.
Commanding Royal Artillery Nagpore Force.

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Detailed Statement of accommodation in the Barracks of the

Block and Room.		How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	Number of Cots in each room.	Number at 90 square feet superficial area.
Block No.	Room.		Length. ft. in.	Breadth. ft. in.	Height. ft. in.				
1	1	Hospitals	...	...	...	...	...	...	...
	2	Do. Verandahs	...	...	...	...	...	...	...
	1	Detention Ward	...	...	...	...	...	...	...
1	1	By N. C. and Men	191	24	17 6	4,584	30,220	47	50
	2	Do.	191	24	17 6	4,584	30,220	47	50
1	2	Verandahs occupied by do.	191	10	10	1,910	19,100	14	...
		Recreation Room	...	...	...	...	...	...	...
	1	Library and Reading Room	...	...	...	...	...	...	...
	1	Workshops	34 6	10	11 6	...	...	...	...
		Canteens	...	...	...	...	...	...	...
	2	Cook Rooms	42 6	15 3	9 6	...	...	...	...
	1	Coffee Shops	...	...	...	...	...	...	...
			8	5	10	...	...	...	...
	3	Ablution Rooms	40 3	13 4	13 4	...	...	...	...
	1	Plunge Baths	...	...	...	...	...	...	...
	1	Harness and Saddle Room	104 4	34 3	11 6	...	...	...	...
		Gymnasium	...	...	...	...	...	...	...
		Ball Court	...	...	...	...	...	...	...
		Skittle Alley	...	...	...	...	...	...	...
		Military Prison	...	...	...	...	...	...	...
		Solitary Cells...	...	...	...	...	...	...	...
	1	Guard Rooms...	37 6	24 4	11 4	...	...	7	...
		Prison Rooms...	...	...	...	...	...	...	...
		2	12 4	7 8	8 6	...	...	...	...
	4	Latrines 1	12	7 6	8	...	...	...	...
		1	21 4	12	9 4	...	...	...	...
	1	Urinals	16	8	9 9	...	...	...	...
		Stables	...	...	...	...	...	...	...
1		Hospital, Veterinary	70 6	13 6	9 4	...	...	...	...
1		Gram Boiling Shed	16 6	12	8 6	...	...	...	...
		Officer's Quarters	...	...	...	...	...	...	...
1	1	Non-Commissioned Officer & Family of 3	29 3	16	12	...	...	...	...
	2		21	16	12	...	...	...	...
	3		21 4	6 6	9 6	...	...	4	...
	4		10	6 9	9 6	...	...	...	...
1	1	Non-Commissioned, Men and Families ...	18 3	12 6	15 6	...	...	...	...
	2		12 3	12	8 9	...	...	...	...
	*3		7 6	6	7 9	...	...	...	...
1	1	Non-Commissioned Quarters ...	18 4	13 6	15 6	...	...	...	...
	2		12	8 8	8 4	...	...	1	...
	3		8 9	8 8	8 4	...	...	...	...
	6	Bath Rooms of Family Quarters ...	8 6	7 9	7 9	...	...	..	...
	3	Cook-houses for do.	18	10	8 6	...	...	...	...

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F. Battery 20th Brigade Royal Artillery, Kamptee.

Cubic contents thus afforded.	Number to be accommodated at Minimum Standard.	Number in excess on inspection.	Openings. Ventilation.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining rooms.	Remarks.
					ft. in.	ft. in.		ft. in.	ft. in.		
...	...	...	...	...	...	...	...	...	...	...	See detailed Statement, Hospitals.
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	
1,604	50	...	...	4	4	6	4	7 3	4 6	...	Raised above roof, arches lead to verandahs.
1,604	50	...	...	4	4	6	4	7 3	4 6	22	
...	...	14	...	...	...	...	13	7 3	4 6	...	
...	...	...	...	...	...	...	...	...	...	...	None
...	...	...	...	...	...	...	...	...	...	...	Included in Barrack-room verandahs.
...	...	...	1*	2	4 / 5 3	4 8 / 4 3	1	7 6	4	...	* Raised on roof.
...	...	...	...	...	...	...	...	...	...	...	See Return for Head Quarters.
...	...	...	3	4	7	5	2 in each	7 / 7	4 / 4	1	Through open tiles in windows. Honey combed.
...	...	...	...	...	...	...	...	...	...	...	Included in Barrack-room verandahs.
...	...	...	...	1	6	4	None	...	...	...	Through open tiles in windows.
...	...	...	...	6	6	4	2	6 6	4	3	
...	...	...	...	...	...	...	...	...	...	...	Information furnished by Division Head Quarters, Detached building.
...	...	...	1*	10	5 3	4 4	10	7 6	4	...	*Raised on roof.
...	...	...	...	...	...	...	...	...	...	...	Information furnished by Division Head Quarters.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	1*	8	4 4	4 6	1 / 1	7 6 / 7 4	4 6 / 4 3	...	* Raised on roof.
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	3	...	...	...	...	...	...	...	Roof raised above the walls and supported by brick pillars (on Dr. Hathaway's system)
...	...	...	4	...	...	...	...	...	...	...	
...	...	...	5	...	...	...	...	...	...	...	
...	...	...	...	4	4	2	...	...	...	1	Through open tiles in window.
...	...	...	...	...	...	...	...	...	...	...	None; horses picketed in open lines.
...	...	...	...	...	...	...	...	...	...	...	One side of length open.
...	...	...	...	7	1 9	1 9	1	6	3 6	...	Through open tiles in windows.
...	...	...	...	...	...	...	...	...	...	...	None, reside in private Bungalows.
...	...	...	...	2	2 9	4 9	2	7	4 3	...	* Raised on roof.
...	...	...	...	3	2 9	4 9	1	7	4 3		
...	...	...	1*	1	2 9	4 9	1	7	4 3	2	
...	...	...	...	1	2 2	1 9	2	6 / 7	2 / 4 3	...	* Raised on roof. There are 20 of the same dimensions, and the average number of occupants is 4 in each "new ablution rooms" adjoining building.
...	...	...	...	1	3 3	3 3	2 (1 / 2)	7 / 6 6	4 / 3		
...	...	...	1*	...	...	...	3 (1 / 2 / 3)	6 6 / 6 8 / 6 9	3 / 3 / 3 4		
...	...	...	..	2	2 9	1 9	1	6 8	3		
...	...	...	1*	1	3 4	3 3	3	7	4	...	* Raised above roof.
...	...	...		1	3 4	3 3	...	6 6	3	...	New.
...	...	...		1	2 8	2 4	...	6 8	3 4	...	
...	...	...	1*	2	2 6	2 6	1	6	3	...	Through open tiles in windows, and raised above roof.* There are six of same dimensions.
...	...	...	1*	4	3 3	4	2	6	3	...	Raised above roof and through open tiles in windows.

(Signed) J. C. TAYLER, Captain,

Commanding F. 20th Royal Artillery.

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Detailed Statement of accommodation in the Barracks

Block and Room.		How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	No. of Cots in each room.	No. at 90 square feet superficial area.
			Length.	Breadth.	Height.				
Block No.	Room.		ft. in.	ft. in.	ft. in.				
		Recreation Room	...	...	...	...	...	...	...
		Library and Reading Room	...	...	...	...	...	...	...
2	2	Workshops	40	20	16 6	...	...	...	...
		Canteen	...	...	...	...	...	...	...
1	2	Cook Rooms	42 6	15 3	9 3	...	...	...	...
		Coffee Shops...	...	...	...	...	...	...	...
	1 } 3 }	Ablution Rooms ... ... {	40 3 8	13 4 5	13 4 10	... ...	... ...	... ...	... ...
		Plunge Baths	...	...	...	...	...	...	...
3	3	Harness and Saddle Rooms	30	20	17 4	...	...	...	...
		Gymnasium	...	...	...	...	...	...	...
		Ball Court	...	...	...	...	...	...	...
		Skittle Alley...	...	...	...	...	...	...	...
		Military Prison	...	...	...	...	...	...	...
		Solitary Cells	...	...	...	...	...	...	...
1	1	Guard Room	50	45	14 6	2,250	32,625	7	25
		Prison Room...	...	...	...	...	...	...	...
3	3	Latrines... ... ... { 1 2 3	24 9 12	12 8 7	8 10 10	... ...	... ...	... ...	... ...
	1	Urinals	16	8	9 9	...	...	...	...
		Stables	...	...	...	...	...	...	...
1	1	Hospital Veterinary	70	13 6	9	...	...	...	...
1	1	Gram Shed	16	12	8	...	...	...	...
		Quarters, Officers	...	...	...				
1	2	Do. Non-Commissioned Officers & men.	191	24	17 6	4,584	80,220	50	50
1	1	Do. Family, &c	18 3	12 6	15 6	228	3,534	...	2
	2	Do. do.	12 6	12	8 9	150	1,312	...	1
	3	Bath Rooms to above*	7 6	6	7 9	...	...	...	...
4	4	Cook Houses for Family Quarters ...	18	10	8 6	...	..	...	...
4	4	Bath Rooms for do.	6	6	7	...	...	...	...

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of the C Battery 14th Brigade Royal Artillery, Kamptee.

Cubic contents thus afforded.	No. to be accommodated at Minimum Standard.	No. in excess on inspection.	Openings. Ventilation.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining rooms.	Remarks.
					ft. in.	ft. in.		ft. in.	ft. in.		
...	...	...	...	...	...	...	...	...	...	...	None.
...	...	...	...	...	...	...	...	...	...	...	Included in Verandahs of Barracks.
...	...	...	1	2	5	5	2	9	5	...	Raised on Roof (new.)
...	...	...	...	...	...	...	...	...	...	...	Information given by Division Head Quarters.
...	...	...	3	2	7	5	2 in each	7 7	4 4	1	4 Honey-combed Windows.
...	...	...	...	...	...	...	...	...	...	...	Included in Verandahs of Barracks.
...	...	...	...	6	6	4	2	6 6	4	2	4 Honey-combed Windows.
...	...	...	...	1	6	4	...	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	Information given by Division Head Quarters.
...	...	...	1	2 in each	2	4	2 in each	9 ...	5 ...	...	3 Rooms of one dimension.
...	...	...	...	...	...	...	...	...	...	...	In course of construction information givenby Division Head Quarters.
...	...	...	...	...	...	...	...	...	...	...	Information given by Division Head Quarters.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Do.
...	...	...	...	...	...	...	...	...	...	...	Do.
1,305	25	...	2	4	5	4	4	...	...	4	Open arches leading from Verandahs.
...	...	...	...	...	...	...	...	...	...	...	In course of erection.
...	...	...	...	...	...	...	...	...	...	...	Raised roofs and supported on Pillars on Dr. Hathaway's system.
...	...	...	1	...	...	...	1	...	...	...	
...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	4	4	2	1	...	...	1	Through open tiles in Window.
...	...	...	...	...	...	...	...	...	...	...	None. Horses picketed in open Lines.
...	...	...	...	...	...	...	...	...	...	...	One side open.
...	...	...	...	...	...	...	...	...	...	...	New.
...	...	...	...	...	...	..	...	...	...	...	None. Reside in private Bungalows.
1,604	50	...	3	4	3 3	4	2	6	3	22	Raised above roof. Arches lead to Verandah.
1,767	2	...	...	1	3 3	3 3	2 { 1 2	7 6 6	4 2	... ...	Raised on roof. There are 20 of the same dimensions and two others for Staff Sergeants one at each end of Block; the average. Number in each 4 (new.)
1,312	1	...	...	...	...	...	{ 1 2 3	6 6 6 8 6 9	3 3 3 3	... ...	
...	...	...	1	2	2 9	1 9	1	...	...	...	* 18 New Bath rooms lately erected one for each of 20 Quarters.
...	...	...	1	4	3 3	4	2	6	3	...	Through open tiles in Window, new.
...	...	...	...	2	2	1 6	2	6	2 6	...	One Honey-combed Window in each.

(Signed) H. PURVIS, Captain, R. A.,

Commanding C. 14th Royal Artillery.

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Detailed Statement of accommodation in the Hospital of Royal Artillery, Kamptee.

Block and Room.		How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	No. of Cots in each room.	No. at 120 square feet superficial area.	Cubic contents thus afforded.	No. to be accommodated at Minimum Standard.	No. in excess on inspection.	Openings.	Windows.			Doors.			Open arches to adjoining rooms.	Remarks.
Block No.	Room.		Length.	Breadth.	Height.								Ventilation.	Number.	Height.	Width.	Number.	Height.	Width.		
			ft. in.	ft. in.	ft. in.										ft. in.	ft. in.		ft. in.	ft. in.		
1	1	Hospital C./D. Royal Horse Artillery.	60	22	25	1,320	33,000	12	11	3,000	11	1	Ridge.	6	5	4	5	7	4½	...	
...	2	Do. F./20th Brigade R. A. ...	60	22	25	1,320	33,000	12	11	3,000	11	1	Ridge.	6	5	4	5	7	4½	...	
2	3	Do. C./14th Brigade R. A. ...	110	18	20	1,980	39,600	18	16	2,329	16	2	Ridge.	8	5	3½	9	7	4	...	
3	4	Female ward	37	18	21	666	13,986	6	5	2,797	5	1	Ridge.	7	4½	3½	2	7	5	...	
4	5	Cook-house	43 0	12 2	11 9	...	...	2	...	...	...	...	*a.* 11 Ridge.	2	4 9	4 8	3	7	4 0	...	*a.* 5 Oval open apertures and 6 honey-combed.
5	6	Latrines, No. 1...	43 0	9 0	11 0	...	...	...	...	...	...	...	*b.* 3	...	...	...	...	...	...	1	*b.* Honey-combed apertures.
6	7	Do. No. 2...	20 0	5 10	9 0	...	...	...	...	...	...	...	*c.* 3	...	...	...	2	7 0	4 2	...	*c.* Open oval apertures.
7	8	Ablution Rooms	40 0	16 0	13 0	...	...	...	...	...	...	...	*d.* 6	...	...	...	1	7 0	4 0	...	*d.* Attic windows.
		Dispensary	16 8	14 6	11 9	242	2,843	...	...	...	...	...	...	2	5 6	4 9	1	7	5 0	...	
		Office...	16 8	14 6	11 9	...	...	...	...	...	...	...	...	2	5 6	4 9	1	7	5 0	...	
		Store-room, No. 1	20 0	16 0	14 0	...	...	...	...	...	...	...	...	1	7 9	5 6	1	5	5 7	...	
		Do. No. 2	11 0	15 2	9 0	...	...	...	...	...	...	...	1	2	5 0	3 7	1	7	4 6	...	
		Convalescent shed	36 0	15 0	7 0	540	3,780	...	4	945	4	...	...	2	4 6	3 0	...	...	...	...	Open sides.
		Detaining ward, No. 1	23 0	22 0	22 0	506	11,132	4	4	2,783	4	...	1	2	5 0	4 0	2	7	4 6	...	
		Do. No. 2	15 0	18 0	17 0	270	4,190	2	2	2,095	2	...	*e.* 2 Ridge.	...	...	...	1	7 0	4 0	...	*e.* Honey-combed windows.
		Dead-house	16 0	12 0	9 0	...	...	...	...	...	...	...	*f.* 3	1	5 6	5 0	2	7 0	4 0	...	*f.* Attic windows.
		Hospital Serjeant's quarters room 1.	16 0	16 0	16 0	...	...	...	...	...	...	...	Ridge.	...	...	...	1	8 0	5 0	3	
		Do. 2 rooms each	16 0	10 0	9 0	...	...	...	...	...	...	...	...	1	4 0	3 0	1	8 0	5 0	2	
		Do. 1 do.	16 0	10 0	9 0	...	...	...	...	...	...	...	...	...	...	...	1	7 10	4 8	2	
		Cook-house	11 0	11 0	10 0	...	...	...	...	...	...	...	*g.* 3	...	...	...	1	7 0	4 0	1	*g.* 3 Open oval apertures.
		Latrines	6 0	6 0	7 0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	Dr. Hathaway's system.
		Bath-room	10 0	10 0	9 0	...	...	...	...	...	...	...	...	1	5 0	3 0	1	7 0	3 0	...	
		Store-room	10 0	10 0	9 0	...	...	...	...	...	...	...	...	1	5 0	3 0	1	7 0	3 0	...	

(Signed) F. W. BOND, Colonel,

Commanding Royal Artillery, Nagpore Force.

Detailed Statement of accommodation in the Hospital of British Infantry, Kamptee.

Block	Room	How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions: Length (ft. in.)	Dimensions: Breadth (ft. in.)	Dimensions: Height (ft. in.)	Superficial area of each room.	Cubic contents of each room.	No. of Cots in each room.	No. at 120 square feet superficial area.	Cubic contents thus afforded.	No. to be accommodated at Minimum Standard.	No. in excess on inspection.	Openings: Ventilation.	Windows: Number.	Windows: Height (ft. in.)	Windows: Width (ft. in.)	Doors: Number.	Doors: Height (ft. in.)	Doors: Width (ft. in.)	Open arches to adjoining rooms.	Remarks.
Male Hospital.	Ward No. 1 ...	Hospital	78	24	13	1,872	24,336	15	15	1,622	15	...	Ridge Ventilation.	...	...	...	1	7	4 2	14	
	2 Enclosed Verandahs ...	Vacant each	78	10	12	780	9,360	...	...	...	...	...		3	5 5	3 8	3	7	4 2	...	
	Ward No. 2 ...	Vacant	90	24	13	2,160	28,080	18	18	1,560	18	...		...	...	...	4	8	5 10	14	
	2 Enclosed Verandahs ...	Vacant each	90	10	12	900	10,800	...	...	...	...	...		3	5 5	3 8	3	7	4 2	...	
	Ward No. 3 ...	Vacant	78	24	13	1,872	24,336	15	15	1,622	15	...		...	...	...	1	7	4 2	12	
	2 Enclosed Verandahs ...	Vacant each	78	10	12	780	9,360	...	...	...	...	...		3	5 5	3 8	3	7	4 2	...	
	3 Rooms ...	Office, Dispensary and Store Room each	12	10	8	120	960	...	...	...	...	...		2	5 5	3 8	1	7	4 2	...	
	1 Front Verandah Room ...	Vacant	16	12	12	192	2,304	...	...	...	...	...		...	...	...	1	7	4 2	...	
	1 Back do. ...	....	31 6	12 4	12	388	4,656	...	...	...	...	...		...	...	...	1	7	4 2	...	
	Ward No. 4 ...	Vacant ...	48	20	8 6	960	1,860	8	8	1,020	8	...		...	...	...	...	...	...	4	
	2 Enclosed Verandahs ...	Vacant each	48 6	8 6	12	412	4,944	...	...	...	...	...		1	5 5	3 8	2	7	4 2	...	
	Ward No. 5 ...	Vacant ...	48	20	8 6	960	8,160	8	8	1,020	8	...		...	...	...	...	...	...	4	
	2 Enclosed Verandahs ...	Vacant each	48 6	8 6	12	412	4,944	...	..	...	...	...		1	5 5	3 8	2	7	4 2	...	
Hospital Serjeant's Quarters.	1 Room	....	16	16	15	256	3,840	...	...	...	...	...	Ridge Ventilation	...	...	...	4	7	4 2	...	
	1 Bath Room	....	6 6	8 6	12	55	660	...	...	...	...	...		1	3	2	1	6 6	2 6	...	
	1 Store do.	....	9 6	6 6	12	61	732	...	...	...	...	...		1	3	2	1	7 4	4 2	...	
	1 Enclosed Verandah ...	....	42 6	6 6	12	276	3,312	...	...	...	...	...		2 1	3 4 6	2 3 2	1 1	7 6 6	4 2 2 6	... ...	
Female Hospital.	No. 1 Ward	Unoccupied	15 6	18	15	279	4,185	...	2	2,092	2	...	Ridge Ventilation	...	...	...	1	7	4 2	...	
	„ 2 do.	Unoccupied	60	18	15	1,080	16,200	...	9	1,800	9	...		...	...	...	2	7	4 2	8	
	4 Rooms Verandah ...	Unoccupied each	10	12	12	120	1,440	...	...	...	...	...		2	4 6	4 2	1	7	4 2	...	
	2 Enclosed do. ...	Unoccupied each	51	10	12	510	6,120	...	...	...	...	...		2	4 6	4 2	2	7	4 2	...	
Nurse's Quarters.	1 Room	....	16	18	15	288	4,320	...	...	...	...	...	Ridge	4	4 6	3 6	2	7	4 2	...	
	1 Bath Room	....	5	7	12	35	420	...	...	...	...	...		...	...	...	1	6	2 6	...	
	1 Enclosed Verandah ...	....	22 6	8	12	180	2,160	...	...	...	...	...		1	4 6	3 6	...	...	...	...	

(Signed) H. BALTON, Major,
Acting Assistant Quarter Master General N. F.

Detailed Statement of accommodation in the

Block and Room.		How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	No. of Cots in each room.
Block.	Room.		Length. ft. in.	Breadth. ft. in.	Height. ft. in.			
Apothecary's Quarters	1 Room	By an Officer...	30	16	14	480	6,720	...
	1 do.	Do.	20	16	14	320	4,480	...
	2 Bath Rooms each.		9	9	10	81	810	...
1 Block; 2 Staff Sergeant's Quarters.	1 Room	Vacant	16	16	15	256	3,830	...
	1 do. Verandah..	Do.	10	16	10	160	1,600	...
	1 do.	Do.	17	10	10	170	1,700	...
	1 Bath Room ...	Do.	10	10	10	100	1,000	...
	1 Room....	By a Family...	16	16	15	256	3,830	2
	1 do. Verandah..	Do.	10	16	10	160	1,600	...
	1 do.	Do.	17	10	10	170	1,700	...
	1 Bath Room ...	Do.	10	10	10	100	1,000	...
Hospital used temporarily as Barracks,	1 Room	By six men of R. H. A. ... — ...	11 6	20	15	230	3,450	6
	1 do. Verandah..	Vacant	9	17	10	153	1,530	...
	1 do.	By two men of R. H. A.	11	11	10	121	1,210	2
	1 do.	Vacant	11	11	10	121	1,210	...
	2 do.	Do. each	10	9	10	90	900	1
	1 do.	By seven men of R. H. A	18 6	20	15	370	5,550	7
	2 do. Verandah.	Vacant each...	18 6	9	10	156	1,565	...
	1 do.	By six men of R. H. A..	18 6	20	15	370	5,550	6
	2 do. Verandah..	Vacant each	18 6	9	10	156	1,565	...
	1 do.	By six men of R. H. A.	18 6	20	15	370	5,550	6
	2 do. Verandah..	Vacant each	18 6	9	10	156	1,565	...
	1 do.	By six men of R. H. A...	18 6	20	15	370	5,550	6
	2 do. Verandah..	Vacant each	18 6	9	10	156	1,565	...
	1 do.	As an Office	11 6	20	15	230	3,450	...
	1 do. Verandah..	Vacant	9	17	10	153	1,530	...
	2 do.	By one man of R. H. A..	11	11	10	121	1,210	1
	2 do.	Vacant each	10	9	10	90	900	...
No. 1, Saddle Room.	1 Room	As a Surgery...	27 6	20	14 6	550	7,975	...
	1 do.	As an Hospital	27 6	20	14 6	550	7,975	4
	1 do. Verandah..	Vacant	58	8 6	10	493	4,980	...
No. 2, Saddle Room.	1 Room	By fourteen men of R. H. A.	27 6	20	14 6	550	7,975	14
	1 do.	Do. do.	27 6	20	14 6	550	7,975	14
	1 do. Verandah..	Vacant	58	8 6	10	403	4,930	...
No. 3, Saddle Room.	1 Room	By twelve men of R. H. A.	27 6	20	14 6	550	7,975	12
	1 do.	By eleven do. do.	27 6	20	14 6	550	7,975	11
	1 do.	Vacant	58	8 6	10	408	4,930	...
Standard Guard Room.	1 Room	As a Guard Room...	20	14	15	280	3,200	7
	1 do.	As a Cell	10	14	15	140	2,100	2
	1 do.	As a Canteen	10	14	15	140	2,100	...
	1 do. Verandah..	Vacant	44	8 6	10	374	3,740	...
No. 4, Saddle Room.	1 Room	By nine men of R. H. A.	27 6	20	14 6	550	7,975	9
	1 do.	By four do. do.	27 6	20	14 6	550	7,975	4
	1 do.	Vacant	58	8 6	10	493	4,930	...
No. 5, Saddle Room.	1 Room	By two men of R. H. A.	27 6	20	14 6	550	7,975	2
	1 do.	By seven do. do.	27 6	20	14 6	550	7,975	7
	1 do.	Vacant	58	8 6	10	493	4,930	...
No. 6, Saddle Room,	1 Room	Do.	27 6	20	14 6	550	7,975	...
	1 do.	As a Coffee Shop	27 6	20	14 6	550	7,975	1
	1 do.	Vacant	58	8 6	10	493	4,930	...
Trumpeter's and Farriers' Quarters.	1 Room	By a Family	12	16 6	10	198	1,980	...
	1 do.		10	16 6	10	165	1,650	2
	2 do.	,, do. each	10	16 6	10	165	1,650	2
	2 do.	,, do. each	10	16 6	10	165	1,650	2
	2 do.	,, do. each	10	16 6	10	165	1,650	2
	2 do.	,, do. each	10	16 6	10	165	1,650	2
Do.	1 do.	,, do.	21	16 6	10	346	3,460	...
	1 do.		10	16 6	10	165	1,650	2
	1 do.	,, do.	12	16 6	10	198	1,980	...
	1 do.		10	16 6	10	165	1,650	2
	2 do.	,, do. each	10	16 6	10	165	1,650	...
	1 do.	Vacant...	21	16 6	10	340	3,460	...
	1 do.		10	16 6	10	165	1,650	...

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Reserve Barracks, Kamptee, (Europeans).

No. at 90 square feet superficial area.	Cubic contents thus afforded.	No. to be accommodated at Minimum Standard.	No. in excess on inspection.	Openings. Ventilation.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining rooms.	Remarks.
						ft. in.	ft. in.		ft. in.			
								1	6 5	4		
...	...	...	...	Partly ventilated on ridge.	5	4 2	3 2	1	7	4	2	These buildings were built in 1851 for a Native Cavalry Regiment—were vacant for several years and then temporarily occupied by a Garrison Battery from February 1864 to December 1865, again vacant until 1867 when considerable alterations were made in them to accommodate families of the 102nd Regiment. The buildings are now temporarily occupied by the C/D Brigade Royal Horse Artillery.
...	...	...	...		2	4 2	3 2	1	6 5	4	...	
...	...	...	...		2	4 2	3 2	2	6 5	4	...	
...	...	...	...	Thatched.	...	...	...	3	6 6	4	1	
...	...	...	...		1	4	3 2	1	6 6	4	...	
...	...	...	...		1	1 6	2 6	1	6 6	4	...	
...	...	...	...		1	1 6	2 6	1	6	4	...	
2	1,915	2	...		...	...	...	3	6 6	4	...	
...	...	...	...		1	4	3 2	1	6 6	4	...	
...	...	...	...		1	1 6	2 6	1	6 6	4	...	
...	...	...	...		1	1 6	2 6	1	6	4	...	
2	1,725	2	4	Thatched.	...	...	...	...	...	...	3	
...	...	...	...		...	...	...	1	6 6	4	...	
1	1,210	1	1		2	3	2	1	6	3	...	
...	...	...	...		2	3	2	1	6	3	...	
1	900	1	...		...	...	...	1	6 6	4	...	
4	1,385	4	3		...	...	...	...	...	...	4	
...	...	...	...		1	3	2	1	6 6	4	...	
4	1,385	4	2		...	...	...	...	...	...	4	
...	...	...	...		1	3	2	1	6 6	4	...	
4	1,385	4	2		...	...	...	...	...	...	4	
...	...	...	...		1	3	2	1	6 6	4	...	
4	1,385	4	2		...	...	...	...	...	...	4	
...	...	...	...		1	3	2	1	6 6	4	...	
...	...	...	...		...	...	...	...	...	...	3	
...	...	...	...		...	...	...	1	6 6	4	...	
1	1,210	1	...		2	3	2	1	6	3	...	
...	...	...	...		...	...	...	1	6 6	4	...	
...	...	...	...	Ventilated whole length of ridge.	3	4	3 6	...	...	...	1	
					2	3	2					
*4	1,993	4	...		3	4	3 6	...	...	...	...	*At 120 square feet.
...	...	...	...		2	3	2	3	6 6	4	...	
6	1,329	6	3	...	3	4	3 6	...	...	...	1	
					2	3	2	...	...	...	...	
6	1,329	6	3	...	3	4	2 6	...	...	...	...	
...	...	...	...	...	2	3	2	3	6 6	4	...	
6	1,329	6	6	...	3	4	3 6	...	...	...	1	
					2	3	2					
6	1,329	6	5	...	3	4	3 6	...	...	...	...	
...	...	...	...	...	2	3	2	3	6 6	4	...	
3	1,066	3	4	...	3	3 6	2 6	...	...	...	3	
1	2,100	1	1	...	1	3 6	2 6	1	6 6	4	...	
...	...	...	...	...	1	3 6	2 6	1	6 6	4	...	
...	...	...	...	...	...	...	...	4	6 6	4	...	
6	1,329	6	3	...	2	4	3 6	1	6 6	4	...	
					2	3	2					
6	1,329	6	...	...	2	4	3 6	1	6 6	4	...	
...	...	...	...	...	...	...	...	3	6 6	4	...	
6	1,329	6	...	...	2	4	3 6	1	6 6	4	...	
					2	3	2	...	...	...	...	
6	1,329	6	1	...	3	4	3 6	1	6 6	4	...	
...	...	...	...	...	2	3	2	3	6 6	4	...	
...	...	...	...	...	2	4	3 6	1	6 6	4	...	
					2	3	2	...	...	...	...	
6	1,329	6	...	...	2	4	3 6	1	6 6	4	...	
...	...	...	...	...	2	3	2	3	6 6	4	...	
...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	1	3	3	4	6	3	...	
...	...	...	...	...	...	...	...	4	6	...	...	
...	...	...	...	...	...	...	...	4	6	...	...	
...	...	...	...	...	...	...	...	4	6	...	...	
...	...	...	...	...	...	...	...	4	6	...	...	
...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	1	3	3	4	6	3	...	
...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	1	3	3	4	6	3	...	
...	...	...	...	...	...	...	...	4	6	3	...	
...	...	...	...	...	...	...	...	...	...	...	...	
...	...	...	...	...	1	3	3	4	6	3	...	

(Signed) D. DINWIDDIE, Lieutenant,

Barrack Master.

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Detailed Statement of accommodation of the 1st Regiment N. I., Kamptee.

Block.	Rooms.	How occupied.	Dimensions. Length.	Dimensions. Breadth.	Dimensions. Height.	Superficial area of each room.	Cubic contents of each room.	No. of Cots at present in each room.	No. at 99 square feet superficial area.	Cubic contents thus afforded.	No. in excess on inspection.	Ventilation openings exclusive of doors and windows.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining room.	Remarks.
			ft.	ft.	ft.									ft. in.	ft. in.		ft. in.	ft. in.		
	1 to 10 Room	Bell of Arm	12	12	10	144	1,440	...	...	...	...	3	...	...	...	1	6 2	3	...	
	1 Room	Quarter Guard	30	14	10	420	4,200	...	...	...	...	...	3	5	3	1	7	3 6	...	
	1 Do.	Do.	15	8	8	120	960	...	...	...	...	...	1	4 2	3	1	6 4	3 4	...	
	1 Do.	Do.	15	8	8	...	...	...	...	...	...	...	1	4 2	3	1	6 4	3 4	...	
	1 Verandah	Do.	54	10	7	...	...	...	...	...	...	..	...	...	...	2	6 9	4 4	...	
	1 Room	Staff Serjeant's Quarter	30	14	12	420	5,040	...	...	...	...	...	2	4 6	2 6	2	6 4	2 4	...	
	1 Do.	Do. do.	14	14	12	196	2,352	2	...	...	...	...	1	4 6	2 6	{1 {1	6 9 6 4	4 4 2 4	...	
	1 Do.	Do. do.	14	14	12	...	...	2	...	...	...	...	1	4 6	2 6	1	6 4	4 4	...	
	1 Bath-room	Do. do.	10	10	6	100	600	...	...	...	...	...	2	2	1 6	1	6	3	...	
	1 Cook-room	Do. Cook-room	14	10	8	140	1,128	...	...	...	...	...	...	...	...	1	6 6	3 6	...	
	1 Privy	Do. Privy	14	10	8	...	...	...	...	...	...	...	...	...	...	1	6	3 6	...	
	1 Room	Do. Quarters	22	16	10	352	3,520	...	...	...	...	...	2	4 6	3 6	2	7	4	...	
	1 Do.	Do. do.	18	16	10	288	2,880	2	...	...	...	...	4	4 6	3 6	{1 {1	7 6 4	4 2 6	...	
	1 Do.	Do. do.	16	11	10	176	1,760	...	...	...	...	...	2	4 6	3 6	1	7 4	4	...	
	1 Verandah	Do. do.	40	8	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	1 Bath-room	Do. do.	15	6	8	90	720	...	...	...	...	...	1	2	1 6	1	6	2	...	
	1 Cook-room	Do. Cook-room	12	8	8	96	768	...	...	...	...	...	...	...	...	1	6 4	3 6	...	
	1 Privy	Do. Privy	12	8	8	...	...	...	...	...	...	...	...	...	...	1	5 7	2 6	...	
	1 Room	Magazine	15	10	10	150	1,500	...	...	...	...	...	...	...	...	2	6 6	2 6	...	
	3 Solitary cells	Each cell	8	8	11	64	704	...	...	...	...	2	...	..	..	1	6	2 6	..	
	3 Privies do.	3 Privies	4	4	11	...	...	...	...	...	...	...	...	...	..	1	2 2	1 8	..	
	1 Room	Store-room	30	14	12	420	5,040	...	...	...	...	...	2	5	3	1	6 9	3 6	..	
	1 Do.	Rear Guard	20	14	8	280	2,240	...	...	...	...	...	2	5	3 2	1	6 4	3	...	
	1 Ward	Hospital	137	16	16	2,192	35,072	33*	22	1,594	11	...	16	4 6	3 6	14	8	4	...	* 32 Cots occupied by sick. Small ward not occupied. The total accommodation afforded at the regulated allotment of 99 feet is 26 sick. J. L. B.
	1 Do.	Do.	28	16	16	448	7,168	2*	4	1,792	...	...	2	4 6	3 6	2	8	4	...	
	1 Surgery	Do.	18	16	16	288	4,608	...	...	...	...	...	{2 {2	4 4 3 3	3 6 3 2	2 1	8 6 6	4 4	...	
	1 Store-room	Do.	8	16	10	128	1,280	...	...	...	...	...	...	...	...	1	5 10	3 6	...	
	1 Bath	Do.	20	8	10	160	1,600	...	...	...	...	...	2	4 4	3 6	1	6 2	4	...	
	1 Front verandah	Do.	204	9½	10	...	...	...	...	...	...	...	...	...	...	..	...	...	...	
	1 Back do.	Do.	183	9½	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	1 Guard-room	Guard-room	11	10	8	110	880	...	...	...	...	...	1	4 8	3	1	8 10	3 6	...	
	1 Cook-room	Cook-house	11	10	8	...	...	...	...	...	...	...	...	...	...	1	5 10	3 6	...	
	1 Godown	Godown	11	10	8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	2 Latrines	2 Privies	12	11	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	

(Signed) ALFRED RISHTON, Lieutenant-Colonel,
Officiating Commandant, 1st Regiment N. I.

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Detailed Statement of Accommodation of the 32nd Regiment N. I., Kamptee.

Block.	Room.	How occupied.	Dimensions. Length.	Dimensions. Breadth.	Dimensions. Height.	Superficial area of each room.	Cubic contents of each room.	Number of Cots at present in each room.	Number at 99 square feet superficial area.	Cubic contents thus afforded.	Number in excess on inspection.	Ventilation openings exclusive of doors and windows.	Windows. Number.	Windows. Height.	Windows. Width.	Doors. Number.	Doors. Height.	Doors. Width.	Open arches to adjoining rooms.	Remarks.
														ft. in.	ft. in.		ft. in.	ft. in.		
Staff Serjeants' Quarters.	1 Room ...	Staff Serjeants	16	14	10	224	2,240	...	...	...	...	...	3	5	4	1	5 7	3	...	
	Do. ...	"	16	11	10	176	1,760	...	...	...	...	...	2	4 10	4	1	7 2	4 8	...	
	Do. ...	"	24	6	6	144	864	...	...	...	...	...	3	5	4	1	7 2	4 8	...	
	Do. ...	"	19	6	6	114	684	...	...	...	...	...	2	4 10	4	1	5 7	3	...	
	Verandah ...	"	52	7	7	364	2,548	...	...	...	...	...	...	...	...	...	...	...	...	
Double Solitary Cells.	2 Cells, each ...	Prisoners	8	8	11	64	104	...	...	...	...	2	...	...	...	2	6 6	3	...	
	2 Latrines ..	"	4	4	11	16	176	...	...	...	...	...	...	...	...	2	2 4	1 11	...	
Place of Arms, Store Room and Guard Room.	1 Room ...	1,000 Stand of Arms	150	16	11	2,400	26,400	...	...	...	...	2	...	...	...	16	9 8	4 7	...	
	1 Store Room ...	For Storing of Arms and Ammunition, &c., of a Regt. of N. I.	30	16	11	480	5,280	...	...	...	...	...	2	5	8 7	2	9 8	4 7	...	
	1 do. ...		8	8	8	64	512	...	...	...	...	...	...	...	...	1	6 7	3 8	...	
	1 Guard Room ...	Accommodation of Non-Commissioned and Men of the Quarter Guard ...	59	8	8	472	3,776	...	...	...	...	...	1	5 2	3 7	2	7	3 10	...	
	1 Room ...	Accommodation for the Prisoners ...	17	8	8	136	1,088	...	...	...	...	2	2	5 2	3 7	2	7	4 8	...	
	1 do. ...	Accommodation for the Native Officer of the day	16	8	8	128	1,024	...	...	..	...	...	1	5 9	4 9	1	6 6	3 7	...	
	Verandah ...	Unoccupied	180	10	8	1,980	13,840	...	...	...	...	...	...	...	...	...	...	...	...	
Hospital.	1 Ward ...	40 Patients	118	16	11	1,888	20,768	20	20	1,038	...	..	10	4 7	3 6	4	7 8	4 8	...	15 only occupied by sick on date of inspection. J. L. R.
	2 Rooms ...	One used as Surgery and one as Office.	12	6	8	72	576	...	...	..	...	...	4	4 6	3 6	2	7	3 6	...	
	1 Verandah ...	Unoccupied	92	6	8	552	4,416	...	...	...	...	...	...	...	...	...	...	...	...	
	1 do. ...	Do.	119	8	8	952	7,616	...	...	...	...	...	...	...	...	...	...	...	...	

J. MILTON, Lieut.-Colonel,

Commanding R. W. 32nd Regiment N. I.

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Detailed Statement of accommodation in the Barracks of the 1st Regiment Light Cavalry, Kamptee.

Block and Room.		How occupied, whether by Troops, Officers, Married Men, &c.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	No. of Cots in each room.	No. at 99 square feet superficial area.	Cubic contents thus afforded.	No. to be accommodated at Minimum Standard of 99 square feet.	No. in excess on inspection.	Openings.	Windows.			Doors.			Open arches to adjoining rooms.	Remarks.
Block.	Room.		Length.	Breadth.	Height.								Ventilation.	Number.	Height.	Width.	Number.	Height.	Width.		
															ft. in.	ft. in.		ft. in.	ft. in.		
1 to 6...	Places of Arms (each)...	Arms and Appointments...	58	18	13	1,044	13,572	...	...	...	...	...	...	2	5	3	6	6 7	3 6	...	
	Front Verandah ...	....	58	6	10	348	3,480	...	...	...	...	...	...	...	...	...	...	...	...	...	
	Back do. ...	....	58	6	10	348	3,480	...	...	...	...	...	...	...	...	...	...	...	...	...	
7...	Standard Guard Room	1 Guard ...	25	16	12	400	4,800	...	...	...	...	...	...	2	3	5	2	6	3	3	
		1 Cell ...	16	8	12	128	1,536	...	...	...	...	...	...	1	4	3 2	1	6 4	3 6	...	
		1 Verandah ...	34	8	8	272	2,176	...	...	...	...	...	...	5	4 2	3 2	2	6 2	3 3	...	
8...	Gram Shed ...	Weighing Gram ...	94	17	7	1,598	11,186	...	...	...	...	...	...	...	...	...	...	...	...	...	
9...	Sick Stables	Sick Horses ..	100	23	8	2,300	18,400	...	...	...	...	...	...	...	...	...	...	...	...	...	
		1 Room ...	12	10	8	120	960	...	...	...	...	...	...	...	...	...	...	...	...	...	
		1 do. ...	12	10	8	120	960	...	...	...	...	...	...	1	3	2	1	6	3	1	
		1 do. ...	12	10	8	120	960	...	...	...	...	...	...	1	3	2	1	6	3	...	
		1 do. ...	12	10	8	120	960	...	...	...	...	...	...	1	3	2	1	6	3	...	
10...	Staff Serjeants' Quarters.	Serjeant-Major and ..	14	16	12	224	2,688	...	...	...	...	...	...	10	4 2	3 1	6	6 4	3 6	...	
		Apothecary 2 Rooms each.	9	16	12	144	1,728	...	...	...	...	...	...	6	4 7	3 6	2	5 10	3	2	
		2 Rooms do...	24	8	8	192	1,536	...	...	...	...	...	...	2	3 8	2 8	...	...	...	...	
		2 Bath-rooms do...	9	7	8	63	504	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Front Verandah ...	62	6	8	372	2,976	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Back do. ...	62	6	8	372	2,976	...	...	...	...	...	...	...	...	...	...	...	...	...	
11	Cook-room ...	....	11	7	8	77	616	...	...	...	...	...	...	...	...	...	1	6	3	...	
	Privy ...	....	7	7	8	49	392	...	...	...	...	...	...	...	...	...	1	5 5	2 5	...	
12...	Cook-room ...	....	12	12	8	144	1,152	...	...	...	...	...	...	...	...	...	1	6 2	3 2	...	
13...	Privy ...	....	6	6	8	36	288	...	...	...	...	...	...	...	...	...	1	5 8	2 8	...	
14...	Sling Shed ...	....	12	12	10	144	1,440	...	...	...	...	...	By doors & windows only.	...	...	...	...	...	...	...	
15	Hospital	Sick	145	20	14	2,900	40,600	30*	29	1,400	29	1		...	...	...	24	7 2	4 4	...	* Eleven only occupied by sick on date of inspection. (Sgd. J. L. R.)
	4 Rooms each		12	10	11	120	1,320	...	...	...	...	...		8	3 2	2 8	4	7 2	2 3	...	
	2 Verandahs ,,		120	10	11	1,200	13,200	...	...	...	...	...	...	...	...	...	...	...	...	...	
16...	Cook-room 2 ,, ...	To Hospital ...	20	14	11	280	3,080	...	...	...	...	...	...	4	4	3 9	2	6 2	3 8	...	
17...	Privy ...	do. ...	11	12	7	132	924	...	...	...	...	...	...	...	...	...	1	6 4	2 5	...	
18	Double Solitary Cells ...	....	8	8	11	64	704	...	...	...	...	...	...	2	1 2	2 6	2	6 2	2 6	2	
	2 Cells each...	....	4	4	11	16	176	...	...	...	...	...	...	...	...	...	...	...	...	...	
	2 Privies ,, ...	....																			
19...	Magazine ...	....	30	14	10	420	4,200	...	...	...	...	...	...	...	...	...	1	6 2	1 2	...	
20...	Store Room ...	....	20	16	12	320	3,840	...	...	...	...	...	...	6	6	3	1	7	5 1	...	
21...	Magazine Guard Room.	....	16	10	9	160	1,440	...	...	...	...	...	...	3	3	2	1	6	3	...	

(Signed) H. E. DYNELEY, Lieut-Colonel,
Commanding 1st Regiment Light Cavalry.

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European Troops.—*Detailed Statement of Accommodation of British Troops at Seetabuldee.*

Block	Room	How occupied	Dimensions: Length	Dimensions: Breadth	Dimensions: Height to wall plate	Superficial area of each room	Cubic contents of each room	Number of Cots at present in each room	Number at 90 square feet superficial area	Cubic contents thus afforded	Number in excess on inspection	Ventilation openings exclusive of doors and windows	Windows: Number	Windows: Height	Windows: Width	Doors: Number	Doors: Height	Doors: Width	Open arches to adjoining rooms	Remarks and Date of construction of Buildings
1 ...	1 ...	Dormitory	79	24	20	1,896	37,920	Occupied temporarily by a Battery of R. H. Artillery en route to Bombay.	21	1,805	...	...	12	2	5	11	8	5		New Barracks, completed Jany. 1869. To be shortly pulled down.
...	1 ...	,, ...	79	24	20	1,896	37,920		21	1,805	...	...	12	2	5	11	8	5		
...	1 ...	Day Room	46	24	24	1,104	26,496		...	...	...	...	12	2	5	8	8	5		
...	1 ...	Serjeant's Day Room	18	18	15½	324	5,022		...	...	...	...	6	2	5	6	8	5		
...	1 ...	,, ...	18	18	15½	324	5,022		...	...	...	...	6	2	5	6	8	5		
...	1 ...	Serjeant's sitting Room	18	14	15½	252	3,906		...	...	...	...	4	2	5	4	8	5		
...	1 ...	,, ...	18	14	15½	252	3,906		...	...	...	...	4	2	5	4	8	5		
...	1 ...	Bed Room	18	10	15½	180	2,790		...	...	...	...	4	2	5	4	8	5		
...	1 ...	,, ...	18	10	15½	180	2,790		...	...	...	...	4	2	5	4	8	5		
...	1 ...	Bath Room	10	10½	14	140	1,470		...	...	...	...	1	8	3	2	8	5		
...	1 ...	,, ...	10	10½	14	140	1,470		...	...	...	...	1	8	3	2	8	5		
...	1 ...	Latrine	10	6	14	60	840		...	...	...	...	2	4	3	2	7	2½		
...	1 ...	,, ...	10	6	14	60	840		...	...	...	...	2	4	3	2	7	2½		
2 ...	1 ...	Serjeant's Rooms	9	13½	10	121½	1,215	...	...	...	...	...	1	6	4½	...	...	...	1 × 7 × 8½	Old Barracks. Not known.
...	1 ...	,, ...	9	13½	10	121½	1,215	...	...	...	...	...	1	6	4½	...	...	...	1 × 7 × 8½	
...	1 ...	,, ...	9	11	10	99	990	...	...	...	...	...	1	6	4½	1	7	3½		
...	1 ...	,, ...	9	11	10	99	990	...	...	...	...	...	1	6	4½	1	7	3½		
...	1 ...	Dormitory	69	35	10	2,415	24,150	Partly occupied by a Battery of R. H. Artillery en route to Bombay.	26	928	...	...	4	6	4½	4	7	3		
...	1 ...	,, ...	69	35	10	2,415	24,150		26	928	...	...	4	6	4½	4	7	3		
...	1 ...	Day Room	28	35	10	980	9,800		...	...	...	...	4	6	4½	2	7	3		
3 ...	1 ...	Guard Room	39	16	9	624	5,116		6	852	...	...	2	8	3	2	6½	4		
...	1 ...	,, ...	12	16	9	192	1,728		...	...	...	...	...	...	...	1	6½	4		
4 ...	1 ...	Officer's Quarters	15	15	14½	225	32,625		...	...	...	...	2	4½	4½	4	7½	4		
...	1 ...	,, ...	15	15	14½	225	32,625		...	...	...	...	2	4½	4½	2	7½	4		
...	1 ...	,, ...	12	15	14½	180	2,610		...	...	...	...	2	4½	4½	2	7½	4		
...	1 ...	,, ...	8	8	8	64	512		...	...	...	...	1	4½	4½	1	6	3½		
...	1 ...	,, ...	8	8	8	64	512		...	...	...	...	1	4½	4½	1	6	3½		
...	1 ...	,, ...	8	8	8	64	512		...	...	...	...	1	4	3	1	6	3½		
...	1 ...	,, ...	8	8	8	64	512		...	...	...	...	1	4	3	1	6	3½		
5 ...	Hospital ...	Ward	35	16	11	560	6,160	...	4*	1,540	...	...	4	4½	5	2	4½	7½		At* 120 square feet.
...		Surgery	12	16	11	192	2,112	...	...	...	...	...	2	4½	5	2	4½	7½		

† Height of walls taken to wall plate.

(Signed) R. TYNDALL,
Executive Engineer, Nagpore Division.

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NATIVE TROOPS.—*Detailed Statement of accommodation of Native Troops, Seetabuldee.*

Block and Room.		How occupied.	Dimensions.			Superficial area of each room.	Cubic contents of each room.	Number of cots at present in each room.	Number at 99 square feet superficial area.	Cubic contents thus afforded.	Number in excess on inspection.	Ventilation openings exclusive of doors and windows.	Windows.			Doors.			Open arches to adjoining rooms.	Remarks.
Block.	Rooms.		Length.	Breadth.	Height to wall plate.								Number.	Height.	Width.	Number.	Height.	Width.		
1	1	Serjeant Major	24	10	11	240	2,640	...	...	...	...	...	2	3	3	5	7	3		
	2	"	14 ½	10	11	145	1,595	...	...	...	...	...	1	3	3	3	7	3		
	3	"	16	16	22	256	5,632	...	...	...	...	...	...	...	...	4	7 ½	3		
	4	"	17	10	11	170	1,870	...	...	...	...	...	...	...	...	4	7 ½	3		
	5	"	17	10	11	170	1,870	...	...	...	...	...	...	...	...	4	7 ½	3		
2	1	Empty...	24	10	11	240	2,640	...	...	...	...	...	2	3	3	5	7	3		
	2	Built for Qr. Mr. Serjt...	14 ½	10	11	145	1,595	...	...	...	...	...	1	3	3	3	7	3		
	3	"	16	16	22	256	5,632	...	...	...	...	...	...	...	...	4	7 ½	3		
	4	"	17	10	11	170	1,870	...	...	...	...	...	...	...	...	4	7 ½	3		
	5	"	17	10	11	170	1,870	...	...	...	...	...	...	...	...	4	7 ½	3		
3	Serjeant Major's cook-house... ...		12	12	10	144	1,440	...	...	...	...	...	3	1	1	1	7	4		
4	Latrine...		6	6	9	36	324	...	...	...	...	...	3	1	1	1	7	4		
5	Quarter Master Serjeant's cook-house...		12	12	10	144	1,440	...	...	...	...	...	3	1	1	1	7	4		
6	Latrine...		6	6	9	36	324	...	...	...	...	...	3	1	1	1	7	4		
7	1	Apothecaries' Quarters...	18	18 ½	12	333	3,996	...	...	...	...	In ridge 12 s. ft.	2	4	4	2	8	3		
	2	"	18	18 ½	12	333	3,996	...	...	...	...		1	4	4	4	8	3		
	1	"	8 ½	8	7	68	476	...	...	...	...	...	1	3 ½	1 ½	1	6	3		
	1	Detail Hospital	30	18 ½	12	555	6,660	...	5	1,332	...	...	3	4	4	3	8	3		
	1	Store	22	18 ½	12	407	4,884	...	...	...	...	...	1	4 ½	5	2	8	3		
							...	...	...	...	...	...	2	3 ½	2	...	...	...		

	1	Store	24	18½	12	444	5,328	...	...	...	...	...	1	4	4	1	8	3	
	1	Room for arms	43	18½	16	795	12,720	...	...	...	...	Ridge 12 s. ft.	2	4	4	3	8	3	
	1	Guard-room	33	18½	13	610	7,930	...	...	...	...		2	4	4	2	8	3	
	1	Cell	17½	10	13	175	2,275	...	...	...	...	...	2	3	1½	1	8	3	
	1 Native Officers Guard-room,	„	12½	18½	13	231	3,003	...	...	...	...	...	1	4	4	1	8	3	
	1	Dry room	18½	16½	13	300	3,900	...	...	...	...	Ridge 8 s. ft.	1	4	4	1	8	3	
	1	Room for arms	43½	18½	16	804	12,876	...	...	...	...	...	2	4	4	3	8	3	
	1	Surgery	25½	18½	13	467	6,071	...	...	...	...	...	2	4	4	3	8	3	
													2	1½	1	...	...	...	
	1 Ward	Hospital (Regimental)...	20½	18½	13	379	4,927	...	3*	1,642	...	Ridge 72 s. ft.	2	4	4	2	8	3	* There were 12 sick on date of inspection... ... (Signed) J. L. R.
													2	1½	1	...	...	...	
	2 „	„	12½	18½	13	231	3,003	...	2	1,501	...	...	...	...	...	4	8	3	
	3 „	„	57½	18½	13	1064	13,832	...	10	1,383	...	...	6	4	4	6	8	3	
	4 Bath-room ...	„	6½	8	7	52	364	...	...	...	...	...	1	4	1½	1	6	3	
	5 „ ...	„	6½	8	7	52	364	...	...	...	...	...	1	4	1½	1	6	3	
8	Cook-house ...	„	16	14	10	224	2,240	...	...	...	...	Ridge. 6 s. ft.	4	1	1	1	7	4	
8	Store	„	16	14	10	224	2,240	...	...	...	...		4	1	1	1	7	4	
9	Latrine	„	9	9	9	81	729	...	...	...	...	...	...	...	...	1	7	4	
10	Apothecaries ...	Cook-house	10	10½	9	105	945	...	...	...	...	...	4	4½	1	1	7	4	Height of rooms taken to wall plate only. Date of construction of building not known.
10	„ ...	Latrine	9	9	9	81	729	...	...	...	...	...	4	1½	1	1	7	4	

(Signed) R. TYNDALL,
Executive Engineer, Nagpore Division.

(True Copies.)

HOWARD B. MONTGOMERY, M.D.,

Secy. Santy. Commr. for Madras.

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